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The British Association at Nottingham

THE idea of an auxiliary organisation working a system of cold stores and refrigerator vans and containers, now being tried by the French railways, is an attractive proposition put forward by Mr. T. M. Herbert, Research Manager of the L.M.S.R., in his paper on "Transport of Food" (summarised on page 440) to the British Association at Nottingham. Up to the present in this country, on comparatively short distances the railway companies have relied rather on rapidity of transport, perishables being carried in well ventilated vans on special fruit, fish or meat trains almost at express speeds. Probably the future will see a combination of both systems. The technical difficulties of maintaining exactly the right temperature throughout the different stages, not only of the journey but of the storage at each end, are less formidable than those of expense, but as Mr. Herbert said, the crux of the whole matter is public demand. There is never any doubt that when public demand is sufficiently insistent and clearly expressed it prevails in obtaining what is wanted; but it has to have the necessary economic backing, and at the moment public demand for many facilities that

engineering and science could supply without difficulty remains latent from the lack of monetary backing. The British Association exists for the advancement of science, and it is curious that the predominant factor which holds up that advance is never seriously discussed at its meetings.

* * * *

The Pleasure of Travelling by Train

The pleasure or otherwise of travelling by train varies directly with the comfort and interest provided by the railway administration. When these attain a high standard, there are few who do not enjoy a railway journey. Comfort depends on such items as the cleanliness and good ventilation of the carriage, on its effect upon the senses of sight and hearing, on its smooth running and the design of the seating, and on tasteful provision for the inner man. On our principal main line trains all these items are fairly well found, though not all of them seem to occupy much of the attention of the staff on some of the humbler services. As to the interest which may be provided to please the traveller, once comfort is assured, there is nothing to beat high speed. But there are subsidiary matters that in earlier days were not thought to be of any moment, such as the notices now occasionally to be seen at the lineside recording summit levels, and where the train passes from one country or county to another, and the half-way point between London and Edinburgh. From the pictures on page 459 it will be seen how attractive such notices can be made by the use of good lettering and simple design. And of course they add to the interest and therefore the pleasure of the journey, if only by arousing the comment from travellers by the Coronation express that half way does not necessarily correspond with half time.

* * * *

The Week's Traffics

The four main line railways show a combined traffic increase of £162,000 for the past week compared with one of £73,000 for the previous week. Total traffics for the 35 weeks amount to £110,634,000, an improvement of £4,658,000 or 4.40 per cent. Passenger train traffics to date reach a total of £50,641,000, giving an improvement of £2,170,000; in the merchandise earnings of £37,696,000 there is a net increase of £1,128,500; and coal class traffics show a net advance of £1,359,500 to £22,297,000. The L.M.S.R. passenger train receipts of £18,707,000 give an increase of £747,000, and the corresponding receipts on the Southern are £610,000 higher, at £11,780,000.

	35th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R.	+ 36,000	+ 6,000	+ 12,000	+ 54,000	+ 1,723,000	+ 4.03
L.N.E.R.	+ 8,000	+ 19,000	+ 13,000	+ 40,000	+ 1,498,000	+ 4.83
G.W.R.	+ 7,000	+ 16,000	+ 19,000	+ 42,000	+ 918,000	+ 5.16
S.R.	+ 27,000	—	—	+ 26,000	+ 519,000	+ 3.60

London Transport receipts for the past week amounted to £557,400, an increase of £100, and for the ten weeks of the current financial year they amount to £5,551,300, an increase of £17,900.

* * * *

Trinidad Government Railways in 1936

The Administration Report for 1936 of the railways and steamer services of Trinidad records that the earned revenue of the combined services was \$723,581, or \$123,867 more than in 1935, and working expenditure was \$712,158, a figure \$24,432 higher than that for the previous year. As compared with a loss of \$83,012 in 1935, there was a net surplus of \$11,423. This surplus was increased to \$14,831 by taking to revenue

\$3,408 from dividends from the Gulf Steamers Depreciation Fund, making the aggregate gross receipts \$726,989. The following table shows the principal figures for the railway and steamer services separately:—

	1935		1936	
	Railway	Island steamer	Railway	Island steamer
	\$	\$	\$	\$
Gross earnings ..	592,312	12,089	722,084	4,904
Working expenditure ..	669,813	17,914	708,092	4,063
Net surplus or deficit ..	77,500	5,824	13,992	841
Passenger receipts ..	125,008	9,719	135,104	4,585
Goods traffic receipts ..	407,040	—	528,115	—
Receipts per train mile ..	1.52	—	1.56	—
Average receipt per passenger carried ..	10.5	—	9.8	—
Average receipt per ton of goods ..	98.6	—	99.2	—
Passengers carried ..	1,183,169	28,606	1,375,200	14,602
Goods traffic (tons carried) ..	422,960	—	543,003	—
Total train mileage ..	405,008	—	522,993	—

The total route-mileage was 118, and track-mileage, including sidings, 147. The increases were principally \$121,074 in goods, and \$10,066 in passenger traffic, increases of 30 and 1 per cent. respectively. Improvement in the sugar industry accounted mainly for the former. Lower rates were introduced to counter road competition, but through rates by rail and railway-worked road feeder services produced increased freights. A large tonnage of water-borne traffic was also diverted to the railway.

* * * *

Overseas Railway Traffics

Traffic of the Buenos Ayres Great Southern Railway for the past week was weakened by wet weather, but for the past two weeks this company records a net increase of £5,275. The best showing among Argentine railways during the past fortnight is made by the Buenos Ayres Western with a traffic gain of £11,381, and the Buenos Ayres & Pacific comes next with an advance of £9,483. At this time a year ago, however, the Great Southern had an aggregate decrease of £105,915, the Western one of £20,044, and the Pacific one of £5,042. The recent poor traffics of the Central Argentine go against substantial increases at this time a year ago. Two days' rain and a feast day affected the traffic of last week.

	No. of Week	Weekly Traffic	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
Buenos Ayres & Pacific ..	10th	78,846	+ 4,537	766,191	+ 52,028
Buenos Ayres Great Southern ..	10th	109,491	- 3,325	1,133,871	+ 74,145
Buenos Ayres Western ..	10th	42,308	+ 2,919	439,021	+ 55,731
Central Argentine ..	10th	119,330	- 26,067	1,314,759	+ 28,685
Canadian Pacific ..	35th	838,400	- 83,800	18,149,400	+ 1,023,200
Bombay, Baroda & Central India ..	22nd	219,825	+ 29,700	3,727,350	+ 282,075

Canadian Pacific gross earnings for the first seven months of the year amount to £15,766,400, an increase of £1,042,000, and the aggregate net earnings of £1,871,000 represent a gain of £317,000.

* * * *

Railways at the Düsseldorf Exhibition

A very well laid out and interesting exhibition is being held at the present time at Düsseldorf to illustrate the industrial progress of the German people, and a visit is indeed instructive as showing what great progress Germany has made towards self-sufficiency. One of the striking features of the exhibition is the economy with which the lesson is driven home. There is no redundancy of exhibits, but they are sufficient to show what has been and is being accomplished. From the railway point of view the Reichsbahn exhibits samples of its latest rolling stock, including steam and electric locomotives, diesel railcars, passenger

and goods vehicles, and the latest type of Mitropa sleeping and dining cars. By means of models and diagrams, railway progress is concisely illustrated, and a universally attractive feature of the exhibition is the Lilliput railway which conveys the visitor not merely round but through the grounds so that a preliminary trip gives him a general idea of the extent of the arrangements. The little trains consist of up to ten cars hauled by scale model Pacific type locomotives which burn home-produced coke. Views of one of these trains, and also of the Reichsbahn exhibits, are reproduced on page 452. A special service of trams takes the visitor from the centre of the city to the gates of the exhibition in a matter of about a quarter of an hour.

* * * *

Day Excursions by Rail and Air

There are several areas in this country where a main line affording views of coastal scenery is favoured with considerable short-distance patronage. Railway Air Services, in conjunction with the Southern Railway, has this summer also been exploiting the appeal of the sea view, in this case between various South Coast airports. Air liners from the Midlands and North here make relatively closely-spaced calls at popular resorts, so that travellers can enjoy inexpensive and scenic journeys with "express" standards of comfort, much as is possible by rail, for example, on the section of the G.W.R. main line between Exeter and Newton Abbot. Day excursion fares are issued from London allowing first or third class travel by rail to and from the coast, with air transport between selected coastal aerodromes. Thus, the excursionist may go by rail to Southampton, fly thence to Brighton (calling at the Isle of Wight) and return by Southern Electric to Victoria. Shorter air trips are also available, and two of the excursions introduce a further variety of transport in the form of a steamer crossing in one direction between the mainland and the Isle of Wight.

* * * *

An Unfortunate Misunderstanding

A summary of Col. Trench's report on the accident to an excursion train near Sandal, Walton, L.M.S.R., on May 30, appears on page 455. The cause was a misunderstanding between a permanent way ganger and a signal lineman, the latter wrongly concluding from the former's words, when requesting him to release some switch connections on facing points, that the ganger had already obtained possession of the line. He therefore did what was asked, but postponed compliance with Rule 77, thinking it safe to do so for a few minutes. The ganger—who knew the train had yet to pass and that there was not enough time for his work before it had done so—had, so he believed, told the lineman he wished the disconnecting done directly possession had been obtained. The result in the end was that a switch blade was left entirely disconnected and was shaken against the stock rail just in time to catch the last bogie in the train. The coach became derailed, and was eventually flung on its side and dragged without its bogies for 250 yd. Two passengers lost their lives. The accident emphasises the misunderstandings that can arise from verbal messages, to guard against which faithful attention to what may seem at times too elaborate rules is essential. The Coroner's jury suggested a traffic official to co-ordinate the actions of those concerned on such occasions. In some circumstances that might conceivably help, but Col. Trench considers strict compliance with present rules enough to ensure safety and avoid risk of misunderstanding. He therefore makes no recommendation.

International Rifle Trophy

American railway riflemen will make every effort this year to bring back to the United States the international rifle trophy presented by the Pennsylvania Railroad in 1927, which was captured by the British team last year. To this end, teams are now being formed to compete in the international contest this month, when the railwaymen's match for the U.S.A. will be shot at Camp Perry, Ohio. The first International Rifle Match for small bore guns, between railwaymen of the United States, Great Britain, and Canada, was shot at Camp Perry on September 11, 1927. The trophy presented that year by the Pennsylvania Railroad Company, for perpetual competition, has been in possession of the English team three times, in 1928, 1932, and 1936. In the contest in 1934 a record score of 7,861 out of a possible 8,000 was made by the U.S.A. team. Railway riflemen all over the U.S.A. are being advised of the contest this September in order to ensure the best possible selections of a team of 20 shooters. The team representing the U.S.A. railway employees will be selected on the basis of scores made in the U.S.A. Cartridge Trophy match, the Lyman Trophy Two-Man team match, and the Preliminary Dewar Course matches. To the winning team in the International contest will go the Pennsylvania Railroad trophy and 27 silver medals.

* * * *

French Train Diagrams

In the principal French railway stations it is the useful practice to indicate the standard formation of main-line express trains by means of coloured diagrams in the form of pictures of the trains in elevation. Thus, first comes the engine, then the various coaches each marked as to class and destination, so that the passenger may be guided to place himself on the platform approximately opposite the spot where his particular coach should come to rest. We were studying such a diagram recently in a P.L.M. station when we were struck by the peculiarity that, instead of the usual standard P.L.M. Pacific or Mountain type locomotive normally indicated, the engines heading the diagrammatic trains were of the P.O.-Midi 4-8-0 type, but with the characteristic P.L.M. fittings. As is well known, these P.O.-Midi locomotives are probably unrivalled for all-over efficiency, but as the P.L.M. can produce some very efficient engines of its own, it would indeed be a compliment to the other company if it were to adopt its design.

* * * *

The Locomotive and the Cork

Those acquainted with the operation of road motor vehicles, and particularly certain types of private cars, know, often as the result of bitter experience, that even a small speck of foreign matter lodged in the jet of the carburettor may suffice to hold up the vehicle by putting the engine out of action. It may not, however, have occurred to everyone interested in railway engines that that humble but significant object, the common cork, weighing say one-twentieth of an ounce, can play equal havoc with the working of a locomotive, and in certain circumstances render *hors de combat* even the latest and largest express engine weighing as much as 170 tons or more, to say nothing of the weight of the train it hauls. This may be strange hearing, especially if it attracts their notice, to members of the executive of a well-known temperance society, who are reported to have adopted the locomotive as the symbol of their activities on the ground that "although a heavy drinker, a railway engine never consumes anything stronger than water." On this

occasion, however, the usual, and we may add useful, function of a cork is not the point at issue, as here it has to do with big-ends and not bottles. It was fortunate that the driver of a crack express, complete with streamlining and "every amenity associated with the latest and most advanced practice" should, during a fleeting inspection of his engine at the only station stopped at in the course of a long inter-city run at high speed, have observed that the cork was missing from one of the connecting rod big-ends. In his considered opinion, not to say that of his superiors, failure to replace the missing object might well have resulted in the locomotive stalling *en route* due to loss of lubricant at one of the most vital points.

* * * *

Railway Construction in Sweden

In recording the inauguration on August 6 of the last section of the long Swedish railway from Kristinehamn on Lake Vänern to the famous Norrbotten iron-ore town of Gällivare, we referred to the hint then given that this line—called the Inlandsbanan—may possibly be remembered as the closing stage in the history of Swedish railway construction. Even if this should not prove to be literally the case, there is little doubt that the completion of the line marks the approaching disappearance of the *Rallare*, the typical Swedish navvies, about whom romantic stories have been told. Their work required them to live in primitive style somewhat like the "hill-billies" of the U.S.A., and their enforced separation from civilisation for lengthy periods has resulted not only in the evolution of a "pioneer" type, but has also invested these *Rallare* with much of the glamour of the mediæval explorer. The Inland Railway has provided a location very much in accordance with the spirit of these men, for a great part of its length runs through a wild region inhabited by elk and other big game. Although projected for strategic purposes, subsequently nullified by the development of air warfare, the work was continued with the object of opening the wilderness of the north, and bringing Lapland into closer contact with the rest of Sweden. Later, when the years of depression might have caused construction to be suspended as a measure of economy, the incentive to continue work was the mitigation of unemployment. Altogether the line has cost 134,700,000 kroner, or about £7,409,000 at par.

* * * *

Why the Traveller is Glum

A woman correspondent has written to the press in defence of that undeserving object, the ordinary man—the mere animated adding machine as employed in bulk wherever industry and commerce thrive. Her strange crusade is in reply to the oft-recurring charge that male travellers are less ready to give up their seats than in the past. She, it seems, has not noticed this tendency, claiming always to be besought to be seated in a few seconds, without having recourse either to the appealing glance or to the high heel ground privily into the softer portions of the unresponsive boot. For this reason she protests against the uncomplimentary description of "the glumly sitting sex" which had been coined for the travelling male by another correspondent. But why "glum"? Is not that a sign of the mental struggle in progress between duty and reason? Too often the offer of a seat is met with loud but false protestations of a preference for standing, which have to be courteously heard and refuted while staggering about on an unstable floor that seems suddenly to be carpeted with other people's feet. Hence, perhaps, the gloomy indecision of those who doubt their ability to combine eloquence and equilibrium.

Tanganyika Railways

DURING the year 1936 there was no change in the length of railway operated by the Tanganyika Government. At the end of the year the system consisted of 1,376½ miles of metre gauge line in two main sections having no physical connection with each other. On the Central Railway the main line of 775 miles runs from the port of Dar-es-Salaam on the Indian Ocean through Manyoni and Tabora to Kigoma on Lake Tanganyika, and a branch of 235½ miles leads from Tabora northwards to Mwanza on Lake Victoria. There is also the Manyoni-Kinyangiri branch of 93½ miles. The Northern (or Tanga) Railway of 272½ miles proceeds from the port of Tanga to Moshi and Arusha, and makes a connection with the Kenya and Uganda Railways. Steamer services on Lake Tanganyika, and wharves at Dar-es-Salaam, Tanga, Kigoma, and Mwanza are under the same administration as the railways.

The report for the year 1936, received recently from Mr. R. E. Robins, O.B.E., the General Manager, who assumed direction on May 15, 1936, contains a number of additional tables and statistics, as well as graphs illustrating progress in railway activities. The outstanding result of the year's operations is that by the general recovery of the country the combined services have after five years once again been able to show a surplus of revenue over expenditure and debt charges of £52,875, which accrues to the general surplus revenues of the territory. A payment of £50,000 has been made by the territory as a contribution towards a renewals fund. On the total estimated cost of the combined system, i.e., £9,925,702, the net earnings give a return of 3·71 per cent., and on the British capital (£5,064,421) the return is 7·27 per cent. On the railways the traffic receipts show an increase of £71,382, which has been general, resulting from the improvement in world trade. Increases in passenger receipts are mainly confined to second and third class travel. The Sentinel cars on the Tanga line continued to give good service. It is noted in the report that there are no purely passenger trains, and that mail trains are mixed trains with reduced loads on account of better timings than true mixed or goods. Except where otherwise stated, the figures in the accompanying table refer to railway operations only:—

	1936	1935
Passengers	366,117	295,008
Metric tons, revenue earning ..	258,480	235,776
Ton-miles	59,310,999	52,451,416
Train-miles	720,637	679,873
Operating ratio, all services ..	49·58 per cent.	52·98 per cent.
Coaching revenue	99,174	83,492
Goods revenue	531,399	477,852
Gross receipts	655,753	594,159
Expenses	327,384	317,944
Net earnings	328,369	276,215
Other services (net)	39,760	35,161
Debt charges, all services ..	315,254	322,435
Profit, all services	52,875	Dr. 11,059

For public goods traffic the average receipt per ton in 1936 was 41s. 12 cents, against 40s. 53 cents in 1935. The largest increase in any one commodity was that of 5,800 tons in ground nuts. Increased prices led to more than half the crop offering for transit in rather less than one-third of the normal season, and for a short period, both plant and storage facilities were tried to their utmost. Rates on this commodity are extremely low and make little, if any, contribution to fixed charges. Cotton goods brought an increase of £10,116 in revenue, but doubt is expressed whether such an increase can be maintained on account of cheap Belgian rates designed to divert the flow of traffic from the east to the west coast. Many reductions in rates and fares on the Tanganyika Railways

were made during 1936. There has been a steady improvement in the condition of locomotive stock, and all water supplies were properly maintained during the year. Fifty-six per cent. of the present engine drivers are Africans, and in the Engineering Department 65 per cent. of the permanent way inspection staff are Africans. In the Traffic Department 75 per cent. of the employees are Africans. The reconditioning of points and crossings by arc-welding has been continued successfully, and the fish-plate shims inserted in 1935 on the Tanga line have improved the running. In his general remarks at the end of the report the General Manager expresses the opinion that the railway must eventually look to Tanganyika alone to provide sufficient revenue to support its system, and in this connection makes reference to the report of Sir Osborne Mance on co-ordination of transport. Considerable progress has been made in the negotiations with the Kenya and Uganda Railways and Harbours as to rates, but the difficulty remains that the improved financial position of that undertaking makes possible a lower standard of internal rates in that territory than Tanganyika can at present afford.

* * * *

Rail Conveyance of Timber

THE British railways have been closely associated with the timber trade since their inception, and for many years they have been the principal inland carriers of timber in its various forms, as well as the largest individual buyers and users in the country. During 1936 about 4,200,000 tons of timber were carried by railway, of which 2,300,000 tons were used for mining purposes. The tonnage of home-grown timber marketed during a year, although small in comparison with the tonnage imported, is still fairly considerable, and every year many thousands of tons are carried by railway from the principal growing areas throughout the country. Imported timber is landed in large quantities at railway-owned docks, where special facilities are provided for its speedy dispatch. Experienced men operate the most modern discharging equipment, and many acres of land have been provided for the dry storage of timber, while at the principal ports large ponds are available for wet storage purposes. Extensive warehouse accommodation is also available at reasonable cost for the storage of the finer woods. When desired, the British railways also perform the services of handling, measuring, sorting and piling into stack, as well as arranging for the payment of sea freights and the clearance of Customs entries to meet trading requirements. They also maintain a large stock of special wagons for the conveyance of round timber, logs and baulks; single and double bolster wagons are used for long lengths, and bogie bolster wagons for pieces of exceptional length.

Round timber is bought and sold by the cubic foot, and the charges for rail conveyance are based on the cubic content of the consignment. Men have been specially trained by the railway companies to perform the loading of this class of timber, and every gang contains an expert timber measurer so that details of the measurements of the timber loaded can be supplied to traders if desired. A further facility of considerable importance to the home grown timber trade is the provision by the railway companies of extensive accommodation at very low rentals for the storage of such timber at the forwarding station, free storage being afforded in many cases (other than at ports) for twenty-eight days. In addition to the conveyance and storage facilities which they provide, the railway companies are also the timber trade's best cus-

timbers as they purchase annually about thirteen million cubic feet of timber for coach and wagon building, sleepers, and general maintenance purposes. While the railway requirements include all well-known hard and soft woods grown throughout the world, large orders are placed for British grown trees and for sawn goods from home grown timber merchants, while extensive purchases are made of Empire woods such as teak from Burma, mahogany from Honduras and Africa, greenheart logs from British Guiana, and Douglas fir from British Columbia and Canada.

German Railway Signalling

INTERLOCKING and block apparatus did not appear in Germany until some years after it was known elsewhere, but it then developed rapidly, on characteristic lines of its own, to a high state of efficiency, resulting in a corresponding freedom from serious railway accidents. Traffic did not increase in the early years to the same extent as in England nor were high speeds usual; nevertheless, the need for signalling of some kind was soon felt. Although the principle of the block system was not put forward in the form enunciated by Cooke in this country in 1842, it was given practical effect in another way by the use of visual telegraphs, consisting of semaphores, baskets, balls and other signs, supplemented by the hoisting and lowering of lights at night, to signal from one watchman to another—and hence from station to station—the approach of a train so that proper steps might be taken to allow it to pass, or to protect any obstacle thereto. This principle was later realised more efficiently by means of the electric gong signal apparatus, introduced in 1846 and still used as an adjunct to the ordinary block. Visual telegraphs were also used to convey orders from stationmasters to their pointsmen, initiating the system of unified station working which still obtains. Thus the fixed signals were at first provided not so much for the guidance of drivers, to whom hand signals were given, but more as a means of communication between those controlling the traffic. However, a change soon took place, and, especially at stations, signals governing the approaching trains were used. There was no uniformity in the shapes and meanings of these early signals. Every railway company had its own ideas, and an eminent Saxon railway authority, Weber, wrote in 1867 that “the signalling on the German railways presents a chaos of signs and meanings, which could hardly be more varied if their creators had arrived at them with the aid of a kaleidoscope.”

The disadvantages of this were reduced to some extent in 1870 by the issue of official signalling regulations for the North German Confederation, in which the adoption of the space interval principle was prescribed. In 1875 a code of signal aspects was laid down for the German Empire, but some divergence therefrom was permitted here and there, notably on the Bavarian lines. In 1892, again except in Bavaria, where the step was not taken for many years, the green “line clear” light replaced the white in all stop signals, while in 1910 the double yellow warning aspect for distant signals was adopted, after being tried in Saxony, but was not installed everywhere for some time. In 1920 the various State systems were united to form the Deutsche Reichsbahn, or German State Railway, making uniform signalling still more desirable. In 1929 the speed signalling principle was adopted, and in 1933 the three-aspect distant signal. The 1935 edition of the official “*Signalbuch*” laid down a standard system of signal aspects for the whole of Germany, and a time limit has been set for the disappearance of those inconsistent therewith.

Concentration and interlocking of levers was first tried about 1868; soon after that the first signal works, still in existence, were established. A few locking frames were obtained from England and some were made locally. With the great increase in traffic after 1871 a large amount of signal apparatus was wanted and many signalling undertakings came into existence. In more recent years the interests of a number of them have been consolidated. At first single-wire and rod working was used, but double-wire transmission for signals and bolts was proposed about 1872, and for points not very long after. Single-wire working then disappeared, but some railways adhered to rodworking for points. Double-wire point working is now the standard. The working of the locking by route handles became regular practice about 1880 and thenceforward German signalling developed along its own distinctive lines, so different from those followed in Great Britain, and eventually spread to some other countries. There being many signal manufacturers, however, a great many types of construction arose, which proved both awkward for maintenance purposes and expensive, and it was not long before proposals for standardisation were put forward. Little was done until the management of the Prussian lines decided to undertake the task about 1901; progress was slow at first, but in 1907 an understanding was come to with the manufacturers. By 1911 a standard locking frame was in existence, and at the present time practically all the details of mechanical signalling have been standardised for the entire Reichsbahn. Of course, the subject is always under review, and modifications are still being made here and there, as experience dictates.

There was no block apparatus, properly so-called, until 1870, and in 1871 the a.c. form of construction appeared. It was soon developed into a lock-and-block, and, with modifications of detail but little changed in principle, it spread throughout the country and was used for double and single lines, as well as for controlling the working in stations, for locking intermediate sidings and swing bridges, for holding the route—enabling locking bars to be largely dispensed with—and for every kind of electric locking, proving a remarkably adaptable piece of mechanism. The absolute block system has always been used, no permissive working being admitted. For several reasons automatic signalling was slow to meet with appreciation. The Barmen-Elberfeld suspended railway adopted a system peculiar to its own requirements in 1903, and in 1913 the first section of track circuit automatic signalling with train-stops was opened on the Berlin Elevated and Underground line, with equipment supplied from this country. The advantages of this method of working have now become well appreciated and there are installations on the Reichsbahn itself, but the prevalence of level crossing block posts, the large use of steel sleepers, and other considerations will probably result in the lock-and-block remaining on the main lines for a long time.

Electric power signalling appeared at Westend, Berlin, in 1896, and the original frame is to be seen in the Verkehrs- und Baumuseum. It developed rapidly and was soon found at a number of stations. The apparatus went through many stages of design. In 1897 a small electro-pneumatic frame was installed at Munich, followed by a large one at Cottbus in 1903. The low-pressure pneumatic and hydraulic systems were also tried, but the all-electric system has been the one most favoured, and the overwhelming majority of power boxes are of that type. The use of trailable points has necessitated the adoption of control circuits having characteristics not found in some other countries: Automatic train stops and train control early attracted attention; one of the most interesting devices was the Stahmer magnetic cab-signal of 1911, while the Van-Braam mechanical apparatus was tried in various

forms from 1906 till 1927. Inductive, optical, and wireless appliances also appeared. An unfortunate run of accidents not many years ago led to the question being again actively pursued, with the result that a considerable amount of very complete A.T.C. equipment is now in service. In the course of their Summer Meeting cruise, which began on September 4, members of the Institution of Railway Signal Engineers travelled from Ham-

burg to Berlin and back over one of the most important railway routes on the Continent, a brief history of which appeared in our issue of August 13, page 280, equipped with inductive A.T.C. and the most approved standard main line signalling. It is hoped that the above particulars and those in the general article on page 443 in this issue will add some interest to their recollections of the journey.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Accidents to Platelayers

London, S.W.5
September 4

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The article under this head in THE RAILWAY GAZETTE of August 27 is a reminder that in this age of safety first there are still some vulnerable spots. The article refers to the impossibility of an audible signal on the closed circuit principle, but may I suggest that investigation should take the line of an "invisible ray" installation, in which the breaking by a train of the light circuit from a selenium cell would suitably actuate relays and cause a warning to be sounded at the proper distance, or, inversely, cause a break in a continuous signal. In the case of multiple tracks there would be a separate circuit for all, and obviously the respective audible signals would be of different pitches. I leave it to the technicians to elaborate the idea, but it does not appear impossible or even costly, and the equipment might be easily transportable. It is nowadays accepted that safety-first appliances, apart from humanitarian consideration, are often economically profitable.

As regards the audibility factor, I am not acquainted with the Tyfon whistle referred to in the article, but I understand the German State Railway is now using compressed air stored in portable cylinders to actuate a powerful hooter for the purpose, and it is said to be very effective indeed and fully to cover requirements as regards the audibility amid noise.

Yours faithfully,
GEORGE L. BOAG

[While it would be possible to have an "invisible ray" installation on the closed-circuit principle to control an audible warning signal, the latter requires energy to make it sound and hence cannot itself be constructed on that principle, unless it sounds all the time the line is clear and ceases to sound to indicate danger, an impracticable course. Nevertheless such signals could probably be constructed so reliably as to render this objection comparatively negligible.—
ED. R.G.]

London—Cambridge Train Services

Wakefield, August 13

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I am interested to read in your issue of August 13 of the new services which the L.N.E.R. proposes to provide in September between London and Cambridge, and *vice versa*. I am, however, surprised, and Cambridge will be disappointed, that an opportunity of satisfying the real needs of the University town has been missed.

Of the new up trains, the 2.20 p.m. is undoubtedly a great improvement on the present 2.4 p.m. to King's Cross, but I am doubtful whether there is a demand for a train at 11.50 a.m., in addition to 11.14 a.m. and 12.30 p.m., except if and when half-day tickets are available on the new train. On the other hand it is still to be impossible to be in London between 9.15 and 9.30 a.m. leaving Cambridge at a reasonable hour with facilities for food on the train; or to leave as late as 6.30 p.m. and be in town in time for the evening entertainments. Similarly, in the

down direction, 11.10 a.m. is a convenient hour for the visitor to Cambridge, but 1.40 p.m. in addition to the 2.5 p.m. from King's Cross seems over-generous, except on Saturdays, when the former is not to run. The much-desired fast service about 6.15 p.m.—to return to the University in time for College dinner—is not, however, to materialise.

I venture to put these points before you, as they are the result of personal experience and much discussion on the subject with all classes of Cambridge—London travellers. As it is, there will be general regret that the more convenient King's Cross has not been made the terminus of the new services (on which a one-hour timing would be perfectly practicable), and that the chief needs of don and undergraduate have yet to be provided for.

Yours, &c.,
"KINGSMAN"

The Paris—St. Germain Railway Centenary

In our issues of August 27 (page 370) and September 13 (page 384) we referred to the centenary of the Paris—St. Germain Railway, which was authorised on July 9, 1835, and opened for public traffic on August 26, 1837. Naturally the subject has received attention in the French press, where the main feature of interest has proved to be the formal inauguration of the line on August 24, 1837, by Queen Marie-Amélie in the absence of King Louis-Philippe. The queen was then 55 years old and her courage was greatly admired at that time, for not many women consented to imitate her example in making a railway journey; for this first trip the engine, hauling six coaches, reached a speed of 30 m.p.h., which, commented the press at the time, was "all that human wisdom would allow one to expect." Leading statesmen were not enthusiastic. Thiers described the train as a plaything only fit to take students and their grisettes out to the forest of St. Germain; Guizot and the scientist Arago were equally pessimistic. The promoters, however, treated their enterprise very seriously, and the specifications for building the line, dated April 10, 1836, comprised 125 modern-sounding clauses. They provided for a single arbitrator in case of disputes, who could settle questions of pay and of "conventions," but not matters of the "art," properly so called, which the engineers must decide.

A French State Railways engineer has sent to *Le Figaro* his copy of the contemporary announcement published by the Paris—St. Germain Railway Company. Illustrated with a view of the line, and of a train made up of a "40-seat wagon," and of "a diligence with 30 inside and 6 outside seats," it gives some picturesque details of the journey.

At first the Paris—St. Germain Railway terminated at Le Pecq, on the opposite side of the river from St. Germain, but travellers were soon insistent that they should be taken through by rail and not be compelled to complete the journey with the aid of a 25-centime connecting bus. The difficulty which arose from the considerable difference in level between Le Pecq and St. Germain was eventually solved by the opening on August 14, 1847, of an atmospheric line, which cost more than fr. 6 million and remained in service until 1859, when more powerful locomotives enabled the St. Germain—Le Pecq incline to be worked by steam.

PUBLICATIONS RECEIVED

The Railway Handbook. 1936-37. London: The Railway Publishing Co. Ltd., 33, Tothill Street, S.W.1. 8½ in. × 5½ in. 96 pp. Paper covers. Price 2s. 6d. net.—For the railway student or enthusiast who, wisely like Walter de la Mare's Linnet Sarah, demands facts and not hearsay, "The Railway Handbook" will provide accurate information under no fewer than one hundred separate headings. Apart from tables giving international comparisons, the data are confined mainly to Great Britain and Ireland, and within these bounds is given a wealth of information impossible to obtain from any other single source of reference at the price. Many of the sections, in this the fourth annual edition, have again been extensively revised, particularly those relating to railway speeds and non-stop runs. The ten-page chronology of railway history introduced for the first time last year has been revised in minor respects, as it has proved a popular feature. Publication of the Handbook has been delayed this year to allow of such amendments to the tables of rates of pay of the principal grades of railway staff as were made necessary by the recent decision of the Railway Staff National Tribunal.

Wages and Labour Conditions in British Engineering. By M. L. Yates. London: Macdonald & Evans, 8, John Street, Bedford Row, W.C.1. 8½ in. × 5½ in. × 1 in. 172 pp. Price 6s. net.—As the author states at the outset of his preface, "the aim of this book is to show the conditions of employment of the principal classes of engineering workpeople, the systems of remuneration, and the wages obtained. It is confined to a factual treatment of these questions, with special emphasis on their development since 1914." Within these limitations the book has its uses, although the railway engineer may well feel surprised at finding in its 172 pages no reference either to the wages and conditions of employment in railway workshops or to the important and comprehensive scheme of machinery of negotiation under which the wages and conditions of over a hundred thousand railway shopmen are settled. Mr. Yates merits praise for the research which the preparation of this volume has involved, as well as for the careful layout of the information obtained. At the conclusion of each chapter is a concise summary which will be valuable to the student, and there is also a useful bibliography of the subject.

Engineering is defined in a general way as "embracing all the industries making finished articles from the products of the iron and steel and other metal industries." The author devotes a good deal of space to wages and conditions in the war and pre-war periods; indeed, some of the tables of wages go back as far as the 'seventies and the

'eighties, and, while this information has an historic value, Mr. Yates is unable—as perhaps the general reader might have hoped—to give comprehensive figures of actual wages paid at the present time throughout the country. He explains that "little has been expressed in written agreements—of either local or national application—regarding the actual rates of wages to be paid to the different classes of engineering workpeople. There are well-recognised rates for different classes of engineering workers all over the country. These 'district rates,' which are time rates for a normal working week, are observed in federated firms, but no formal agreement has been made accepting them. Numerous agreements are, however, in existence, based on these recognised district time rates. Several of these agreements define precisely the variations from the recognised district rates which shall be made for work done under special conditions." He quotes, however, a table (No. 28) showing the "Amalgamated Engineering Union List of Minimum Rates of Wages for a Normal Working Week of 47 Hours in the Engineering and Machine-Making Workshops of Manchester District (January, 1937)."

The time rates quoted are inclusive of the national bonus, reference to which reminds us that as from August 23, 1937, the bonus was increased by 1s. 6d. a week, and a further increase of 1s. 6d. will take effect from November 15, 1937. Mr. Yates's book was sent to press before the announcement of the important agreement between the employers and the trade unions. Doubtless in any reprint of the book, Mr. Yates will embody reference to this agreement, especially as it made a revolutionary change in the matter of holidays with pay. Incidentally, the Trade Union Federation has been known since July, 1936, as the Confederation (not Federation) of Engineering and Shipbuilding Trades.

Perhaps the most interesting chapter is that describing the different systems of wages in engineering, namely, time-work, piecework, differential piece rate, individual premium systems, Bedaux system, Rowan system, Halsey system, other individual bonus plans, Emerson system, Gantt system, lieu rates, collective bonus schemes, pattern-makers' bonus scheme, profit-sharing, and co-partnership. Concerning these systems Mr. Yates says, "for several years the craft unions opposed the development of piecework or any alternative system of payment by results. Gradually their attitude changed, and at the present time no opposition is raised by any union to the principle of payment according to output, but there are individual systems to which objection is taken."

The fact, which the author mentions, that there is no other work covering the same ground is sufficient justification

for this book, which, no doubt, will find ready acceptance in the field for which it was written.

Stock Exchange's Ten-Year Record: No. 29, 1937. London: Fredc. C. Mathieson & Sons, 16, Copthall Avenue, E.C.2. 10½ in. × 7½ in. × 1¼ in. 580 pp. Price 20s. net.—Investors will find this "Ten-Year Record," now in its 28th issue, of great interest and value. It sets out the highest and lowest stock prices and the dividends and bonuses paid during the ten years 1927 to 1936 inclusive, for a very wide range of undertakings, the securities of some of which, though of considerable importance, are not quoted in London. The ten-year period covered by the "Record" was one of wide fluctuations in values, particularly in railway stocks. Prices of L.M.S.R. ordinary stock varied, for instance, between a highest of 79½ in 1927 and a lowest of 9½ in 1932, and of Southern deferred ordinary between 45½ in 1927 and 5 in 1932. Argentine railway stocks have been affected not only by the general depression, but also by the continuing difficulty of exchange. Buenos Ayres Great Southern ordinary stock fell from a highest of 114½ in 1927 to a lowest of 13½ in 1935, and Central Argentine Railway ordinary from a highest of 102½ in 1928 to a lowest of 7 in 1935. The changing fortunes of Irish railways can also be traced. Actual dates of payment of dividends are given, thus supplementing the information supplied in official publications of the dates when securities become *ex div.* Getting these dates right is of particular importance in declarations of income, as income tax is now claimed for the date on which dividends were paid, regardless of the period during which they were earned.

Copper and Aluminium Sheets.—We have received from British Insulated Cables Limited, Prescott, Lancs, a catalogue of copper and aluminium sheets, and of aluminium matting. These are supplied in all gauges, and the aluminium sheets may be obtained with plain, satin, or frosted finish. The firm was among the pioneers of aluminium matting, which is supplied either in pure form or in a special alloy suitable for positions subject to extra hard wear.

Patent Windows.—Hallam, Sleight & Cheston, Widney Works, Bagot Street, Birmingham, has issued an illustrated folder showing various types of window for public service vehicles incorporating the Widney patent Simplast glazing system. The Simplast pans for these windows, which may be of the opening or the fixed type, are of pleasing appearance, and the attractive feature of radiused corners is secured effectively and with economy. A special pan section is produced for bus destination fronts glazed on the Simplast system. These fronts are supplied in a variety of modern, streamlined forms according to customers' requirements.

THE SCRAP HEAP

SWEET MUSIC FOR GOLFERS

When a golfing week-end party recently left Euston for Gleneagles, a piano was carried on the special train for the entertainment of the guests.

* * *

In May, 1881, a fast young man in Washington, twice arrested for stealing a locomotive, and again for stealing a hack and pair of horses, was believed to be insane. The *Detroit Free Press* commented: "his operations were too small. If he had only stolen a railroad, locomotives and all, he would be called a capitalist and a railroad king, and perhaps be sent to the Senate if he wanted to go."

* * *

A distinguished bishop, while making a journey by rail, was unable to find his ticket when the inspector asked for it. "Never mind, bishop," said the official, who knew him well. "I'll get it on my second round." However, when the inspector passed through the coach again the ticket was still missing. "Oh, well, bishop, it will be all right if you never find it," the inspector assured him. "No, it won't," contradicted the bishop. "I've got to find that ticket. I want to know where I'm going."

* * *

APPLY NAMED

Hikers who took part in the Victorian Government Tourist Bureau's mystery hike on the King's Birthday holiday, June 14, promptly called it the "Riddle Hike." Both the destination of the special train and the route of the hike remained an unsolved riddle until, approaching a station, the train suddenly slowed down. Peering from the train, the hikers with perfect unison shouted: "The riddle's solved: we're here—its Riddell!" And the "Riddle Hike" through the Riddell district was voted to be one of the most exhilarating yet planned by the bureau.

* * *

The Americans have adopted a novel method of showing their appreciation of Mr. Bessemer's service to science. In the midst of one of the richest iron and coal districts of Cincinnati they have begun to build a new city, which from its geographical position and local advantages, will probably become one of the largest centres of the trade in America. To this city they have given the name of Bessemer.—*From the "Journal of the Society of Arts," January, 1873.*

* * *

In Captain Marryat's Diary there is an amusing account of an American railway:—"The Utica Railroad is one of the best in America; the eighty miles are performed in four hours and a half, stoppages for taking in water, passengers, and refreshment included. The locomotive was of great power, and as it sported along with a train of carriages of half a mile long in tow, it

threw out such showers of fire, that we were constantly in danger of conflagration. The weather was too warm to admit of the windows being closed, and the ladies, assisted by the gentlemen, were constantly employed in putting out the sparks which settled on their clothes—the first time I ever heard ladies complain of having too many sparks about them. As the evening closed in, we actually were whirled along through a stream of fiery threads, a beautiful, although humble, imitation of the tail of a comet."

* * *

A STRANGE RAILWAY

According to a recent issue of the *Canadian Railways Magazine*, one of the strangest railways ever built was that of Captain Bauendahl, a retired German navy officer, whom the explorer Roald Amundsen encountered in Spitzbergen thirty-five years ago. Bauendahl had previously failed in several attempts to reach the North Pole; and perceiving that the prime difficulty lay in the extraordinarily rough surface of the ice in the Polar Sea, where the ice surface is broken into myriads of irregular hummocks, ranging in mass from the size of a brick to the size of a house, he began to build an overhead railroad track

that would reach from Spitzbergen to the Pole, a matter of 800 miles. To this end, he brought from Germany a large number of heavy poles, to be set up in the ice at intervals, and heavy wire to stretch between them. Some kind of a car was to hang by an overhead wheel which should roll on this wire as a track. Bauendahl actually managed to get a few miles of his quaint railroad built before the patience of his workmen gave out. Amundsen, in his "Life as an Explorer," caustically cites the German's idea as a perfect illustration of the common failing of inventing a plausible solution of a problem by considering only one aspect.

One morning (a very few months before August, 1914) the international European express from Paris to Milan was approaching the ornate entrance to the long Simplon tunnel at the Swiss station of Brigue. Travellers who have taken that route along the rushing and tumultuous waters by the banks of the Rhone, will recall that before the long train of coaches enters the miles of tunnels, they pass under a stately portico of massive rock, surmounted by the Lions of Switzerland in stone. But they do not know what is hidden in the roof of that portico. Suddenly, massive chains holding up a huge door of iron and concrete, snapped and let fall this huge barrier, many hundreds of tons, right on to the metals, completely blocking the iron way down through the steep tunnels to Domodossola. These chains themselves weigh several tons. Luckily the terrific crash of metal on stone was heard by the signalman and he set the semaphores against the rushing express. A terrible disaster would surely have resulted had the heavy train hit the door, which is the war-door built into the rock, and set there by the Swiss government to block an invasion by Italians by railroad through the tunnels. No one, apart from secret service men and some railroad engineers, knew of this secret of the Swiss government.—*From "Mysteries of the Great War" by Harold T. Wilkins.*



Driver Tom Clarke looks round with an oil can. Even a cork missing from a rod bearing would be certain to attract his attention

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

BURMA

Fifty Miles of Main Line Affected by Breaches

A memorandum, dated August 5, issued by the Chief Railway Commissioner states that the most disastrous series of breaches known in Lower Burma for very many years occurred at the end of July and beginning of August. These extended at intervals along the Rangoon—Mandalay main line from mile 67½—where the abutment of a two-span bridge had been undermined and fallen into the flood—to the 117th mile. The line throughout is double and forms the main artery of traffic from Upper and Central Burma and the Shan States to Rangoon. In the 2½ miles beyond mile 73½ there were also four other breaches and another damaged bridge, over 400 ft. of the bank having been washed away. In the 74th and 76th miles a further 500 ft. of breaches occurred. Minor damage followed to Daiku where there was a 650 ft. breach in the three-line embankment, and in the 83rd to 86th miles an aggregate length of 1,250 ft. of line was breached, the rails twisted and great quantities of ballast lost irrecoverably.

Station Submerged and Bridge Abutments Destroyed

Beyond Pyuntaza station there were more minor breaches, and Ngadatky station was practically submerged, long lengths of ballast being washed away; these remarks also apply to the length onwards to Thategon (mile 106). Beyond the latter point there were one large and many smaller breaches, and the next serious damage occurred at bridge No. 168 (one 60-ft. and two 40-ft. girder spans) where the up line north abutment was washed away, as were 200 ft. of the embankment. At Penwagon station the buildings were undermined, and breaches 450 ft. in total length occurred in the station yard. Between miles 115 and 116½ a further 500-ft. of line was washed out, though here the breaches were only from 4 ft. to 7 ft. deep, whereas many of those detailed above were 10 ft. to 15 ft. deep.

The Pegu—Moulmein branch also suffered severely between the 112th and 116th miles, where breaches aggregating 1,650 ft. in length and mostly 10 ft. to 12 ft. deep took place, and the abutment of a bridge collapsed.

Repairs and Traffic Interruption

Repair work is reported to be going on rapidly, thousands of men being employed under a large staff supervised by the Chief Engineer, and every effort is being made to restore the up main line—which is the less damaged—so that single line working through-

out may be resumed within about three weeks. The down line embankment is so seriously damaged that double line working is not expected to be restored within two months. Repairs to the Moulmein line were expected to take about a fortnight. Meanwhile mails were diverted by an entirely different route: to Promé by rail, thence by road to Taungwingyi and onwards by rail to Pyinmana (on the main line) and the north.

INDIA

Railways and Commerce

At Bombay, the Chief Commissioner and the Financial Commissioner of Railways recently conferred with the Agents of the G.I.P. and B.B. & C.I. Railways on various railway matters, and subsequently discussed with the local Chambers of Commerce the Wedgwood Committee report, the capital programme of the railways, railway finances in general, and the position of the railways in the economic life of the country.

On their arrival at Madras, the Railway Commissioners not only discussed various railway problems with the Agents of the M. & S.M. and S.I. Railways, but held important conversations with the Premier and other Ministers of the Madras Government. The long-standing dispute over the Tinnevely—Tiruchendur Railway and road-rail competition in Tinnevely formed important subjects in the talks. Sir Guthrie Russell and Mr. B. M. Staig also discussed various matters of railway interest with the Southern India Chamber of Commerce.

Coal-Owners Grievances

Subsequently they met the representatives of the Indian Colliery Owners' Association at Jharia, and of the Indian Mining Federation at Calcutta. The proposal to perpetuate the existing surcharge on coal freights by incorporation in the basic coal freight was opposed by both bodies. It was urged that surcharge was levied as an emergency measure when railway earnings were low. Railway earnings had since improved, and there was every likelihood that the improvement would be maintained. The coal industry, which provided the bulk of the traffic on the E.I. and B.—N. Railways and a substantial proportion of the total traffic on all lines, was entitled to participate in this return to prosperity. The railways could help in the restoration of prosperity in the coal business by the abolition of the surcharge. Increased raisings from State-owned collieries and the sale of slack coal to the public by State-owned collieries were likely to affect

seriously many private collieries. Sir Guthrie is reported to have stated that the surcharge would have a prior claim to revision, and relief in respect of coal freights would be sympathetically considered when the railways were satisfied that the present improvement in earnings would continue. He further observed that the question of a special freight for soft coke would be carefully examined if the Railway Board was supplied with relevant facts and figures.

Small Articles by Goods Train

The Committee of the Bengal National Chamber of Commerce represented to the Railway Commissioners the necessity of reducing the minimum weight of packages despatched by goods trains from 14 seers (28 lb.) to 7 seers (14 lb.), and the minimum weight for charge to 10 seers (20 lb.). It was suggested that in a poor country like India manufacturers had frequently to book orders for consignments of 5 to 7 seers, the despatch of which by goods train was impossible under the existing rules and practices. Despatch by passenger train involved much higher freight, resulting in increased cost to the consumer. The development of Indian industries was thus retarded. The Chief Commissioner undertook to place the matter before the Indian Railway Conference Association, and also asked the committee to submit a representation to the Government of India. He pointed out at the same time that the Indian Railway Conference Association had recently granted a concession in respect of rates for mixed consignments of toilet requisites.

The question of the railways engaging in business outside the legitimate scope of their activities was discussed at length, the committee claiming that private enterprise should not be subjected to unnecessary competition from State-owned railways.

Calcutta Central Station and Suburban Electrification

An interesting discussion next ensued on the urgency for improvement of the existing facilities for the suburban passenger traffic around Calcutta. The committee urged the construction of a central station at or near Dalhousie Square with overhead or underground connections with Howrah and Sealdah the existing termini. Electric traction for the suburban services was also advocated. It is understood that Sir Guthrie agreed that the proposal was the ideal to be aimed at, but he regretted that the surveys conducted by the Government did not encourage him to feel that the scheme would be practicable in the near future, as it would cost something like Rs. 14 crores (£10,500,000).

The committee next expressed its views on the recommendations of the Wedgwood Committee, in connection with which Sir Guthrie pointed out that the Government had not come

to any decision yet on the recommendations. He promised to place the views of the Chamber before the Government of India, and he gave the assurance that these would receive most careful attention.

CANADA

Line Closed to Passenger Traffic

After 23 years of continuous operation, passenger train service was withdrawn from the Dunnville, Ontario, and Smithville section of the Toronto, Hamilton and Buffalo Railway on August 15. Freight traffic will, however, continue to operate daily over the line from Dunnville to Hamilton and Welland. The Dunnville-Smithville section was built originally to connect the T.H. & B.R. main line with the company's Port Maitland-Ashtabula train ferry, which was, however, closed in 1931.

C.P.R.-Marconi Exhibition Car

A Canadian Pacific Railway coach has recently been adapted and equipped as a special exhibition car for the Marconi Company. The seats have been replaced by a display counter, and the interior decoration has been carried out by the Marconi Company. One end of the car is fitted up as a living compartment for the Marconi General Sales Manager, who will be in charge of the car during an extensive tour of the C.P.R. system.

UNITED STATES

Wage Rise Agreement

The railways have agreed with the 14 "non-operating" trades unions (i.e., the unions representing all employees excepting train crews) for a rise in hourly wage rates of 2½d. On a percentage scale, the ratio of increase will average about 8 per cent. for all grades of these employees, being, of course, much higher for the lower than for the higher-paid grades. The unions' original demand was for an increase of 10d. an hour.

Negotiations are still in progress between the railway managements and the train crew unions on their demand for a 20 per cent. increase. It is believed that the managements will strongly resist a grant to these employees relatively as large as that granted to the non-operating employees, since the train crews are already the highest-paid class. Moreover, as they are paid by the mile in freight service when speed exceeds 12½ m.p.h., and in passenger service when speed is greater than 20 m.p.h., the general acceleration of train speeds has already given these employees a large increase in their average hourly compensation.

The increase to the non-operating employees will cost the railways £19,600,000 annually (on the basis of 1936 operations). If a similar increase were granted to the train crews, the

annual increase in expense to the railways would rise to £30,000,000, a figure that would all but obliterate the net income earned in 1936, namely, £33,000,000.

Offsetting, possibly, the loss of net income which the wage increase will cause, is the railways' case now pending before the Interstate Commerce Commission, in which they are seeking increases in freight rates to yield about £20,000,000, or just about sufficient to cover the cost of the wage increase awarded to the non-operating employees.

Another reason why the railways feel less justified in granting an increase to the train and engine crews is the fact that their unions are active sponsors of "make-work" legislation, limiting the length of freight trains and requiring supernumerary employees on trains, a policy that has as its sole purpose the enforced employment of additional brakemen, and of other train and engine men. The non-operating unions have refrained from supporting such legislation.

Traffic and Earnings Increase Moderates

Net railway operating income (before the payment of interest on bonds, but after deducting taxes and all other expenses) of the American railways in the first half of the present year totalled £59,470,000, as compared with £47,600,000 earned in the first half of 1936. Gross revenues at £417,450,000 showed an increase of 11.5 per cent. above the figure for the first six months of last year, and operating expenses at £311,780,000 were higher by 9.7 per cent.

Meantime, the improvement in railway traffic over last year's has slowed down. Freight car loadings, which until June averaged from 10 to 15 per cent. above those of comparable weeks last year, are currently running at only about 5 per cent. above last year. However, the slowing down may perhaps save the railways the embarrassment of suffering a car shortage when the seasonal traffic peak is reached in October—a condition which almost certainly would have arisen had average weekly carloadings persisted at 15 per cent.

"Frozen Per Diem" Plan Abandoned

The railways have abandoned their "frozen per diem" plan, adopted more than a year ago with the purpose of curtailing the movement of empty freight cars. The "per diem" plan of payment for the hire of freight cars calls for daily payment to the railway owning a car of 4s. by the railway on whose line the car happens to be each midnight. Under this system, when cars are plentiful, there is a temptation for each railroad to send all "foreign" cars back to their home lines empty, in order to reduce car rental charges; and conversely, for each railway to load only its own cars for off-line movement,

in order to increase its car rental receipts.

The "frozen per diem" plan provided that the railways pay each other for car hire at the average rate they had been paying over a term of years, the belief being that, with the economic motive for sending "foreign" cars home empty removed, the movement of empty freight cars would be reduced. There is no question that the plan succeeded to a large degree in this part of its objective. But it also removed the incentive to return cars quickly to the railways owning them, and, with a shortage of freight cars impending, railways owning plenty of cars naturally wanted them to meet the requirements of their traders. Hence the plan was dropped. It was a good plan for times of surplus cars, but not so successful from the standpoint of the individual railway when the supply threatened to become inadequate.

URUGUAY

Educational Railway Travel

Within the past few months, the General Manager of the Central Uruguay Railway, Mr. H. H. Grindley, O.B.E., has embarked on a new departure, so far as that railway is concerned, by the appointment of a Chief Public Contact Officer, Mr. N. R. Bush, with the special mission of studying the needs of the public *vis-a-vis* the services which the railway actually supplies or might be induced to supply. One outcome of the efforts of this officer to popularise railway travel has been the introduction of a new type of excursion, which has been so popular that it seems likely to become a permanent feature of the railway's services. Briefly, the idea is to provide an excursion trip for children which will be not only entertaining but educational, and which will also be of interest to parents and teachers. To this end, all passenger coaches on the train are equipped with loud-speakers, connected to a sound amplifier and microphone installed in a special observation car next to the locomotive. On the outward journey from Montevideo, attention is drawn to all objects of interest *en route*, in the belief that more practical knowledge is obtained and retained through the eye than by any other method. Experience has made the transmission so efficient that it constitutes an education in the history, geography, industry, fauna and flora of the district traversed. Simple language is used, and plenty of variety is introduced into the talks so as to avoid too much resemblance to a school lesson. At the point of destination lunch is taken, games are played and visits paid to any local places of beauty or interest. During the return journey, which is started at dusk, a programme of popular music is transmitted and "community singing" is encouraged.

The plan, which proved successful from the first, makes the journey itself

the most enjoyable part of a day's outing, regardless of weather conditions, and almost regardless of the attractions at the point of destination. A knowledge of the people has made it possible to evolve a programme that is pleasing and instructive for both old and young, and its practical value has been manifested in many ways, notably in the inculcation of an unusual degree of tolerance, goodwill and co-operation. From the point of view of railway operation, an interesting, and possibly unique feature is that, except for the actual train working, the whole excursion is in charge of the staff of the Public Contact Office. The advertising of the train is done in the name of the Chief Public Contact Officer, who accompanies it and takes an active part in the proceedings. The apparently trivial innovation of having a senior officer with authority in charge, whom the public knows, and to whom it can appeal in the certainty that its interests will be cared for, has proved a great success, and his presence on the trip makes it easy to depart from the conventional, when necessary, and to remove any unfavourable individual impressions which some trifling incident may produce.

Popularity of Excursions

These excursions are run at specially reduced rates, and the number of passengers increased from 950 on the first occasion to nearly 2,000 on the second, when it was necessary to run a double-headed train with 22 coaches, the maximum allowed by draw-bar strength, in accordance with the configuration of the line. These results were obtained in midwinter, under unfavourable weather conditions and with a public which is as yet far from being "travel-minded."

AUSTRALIA

The New South to West Route

IN THE RAILWAY GAZETTE of July 30 the official opening was recorded of the new chord line from Red Hill to Port Pirie and Port Augusta which shortens the distance between Adelaide and Western Australia by 70 miles and reduces the number of changes of gauge from two to one. The sketch map opposite shows the old and new routes, 260 and 190 miles in length respectively, distances which, however, do not represent the great saving in time that the latter will effect when it has settled down for fast running and when the new locomotives now on order have been delivered for service over this route. Already the time taken by the Port Pirie route is 9 hr. in the west-bound and 5 hr. 10 min. in the east-bound direction less than by the old Terowie route, but by the end of this year it is hoped that a whole day will be saved.

The Routes Compared

The reason for this expected saving is that whereas the ruling gradient of

the new route is 1 in 100, and its sharpest curve 60 ch. radius, and the gauge throughout is 5 ft. 3 in. or 4 ft. 8½ in., the 3 ft. 6 in. gauge section from Terowie to Port Augusta has 1 in 45 grades and 6-ch. curves limiting speeds to 20 m.p.h. on some sections. Besides the advantages in time, distance, and the elimination of one break of gauge, it will be possible to run 460-ton expresses of large, comfortable, air-conditioned stock at 60 m.p.h. over the new route, instead of the relatively cramped 175-ton maximum load trains over the old, which has to negotiate the Flinders Range.

The New Sections of Line and Locomotives

The new lengths of construction are: Port Augusta to Port Pirie (4 ft. 8½ in. gauge) 56½ miles, carried out by the Commonwealth Railways; and Red Hill to Port Pirie (5 ft. 3 in. gauge) 27½ miles, the work of the South Australian Government Railways. The new locomotives for the former section of line have already been referred to in THE RAILWAY GAZETTE, but it may be mentioned that they will closely resemble the New South Wales "C.36" class in general design, and will have 23-in. x 26-in. cylinders, 5 ft. 9 in. coupled wheels, and will exert a tractive effort of 30,500 lb. at 85 per cent. boiler pressure. Their total weight, including the special 12,000-gal. tenders already

mentioned, will be 205 tons in working order. They are under construction by Walkers Limited, of Maryborough, Queensland, and owing to the difficulty in obtaining deliveries of steel, were not available at the time of the simultaneous opening of the two new sections of line.

Port Augusta Workshops

The Commonwealth Railways workshops are at Port Augusta, all repairs to locomotives, carriages and wagons, as well as rail and road petrol vehicles, civil engineering and telegraph equipment being concentrated there. These shops are of modern design and construction, and all passenger stock for the Trans-Australian and Central Australian lines is now built in them. Electric power generated by one 500-kW. and two 205-kW. diesel-driven sets with a voltage of 460 d.c., is used throughout. The power house is a sealed air-conditioned building, and it also generates power for the workshops compressed air plant, and supplies electric current to Port Augusta Corporation.

Victorian Government Railways

New Train de Luxe

After being placed on exhibition and making exhibition runs, the new Melbourne-Albury Limited air-conditioned, streamlined train is to be put into service in September. In addition to the original 12-car set, two spare first and two second class cars are to be built. The four "S" class Pacific locomotives for working this train have been named after early explorers in Victoria, namely: No. 300, *Matthew Flinders*; No. 301, *Sir Thomas Mitchell*; No. 302, *Edward Henty*; and No. 303, *G. J. Latrobe*. The engines and train will be painted royal blue with one broad gold band above the windows and one below, running the whole length of the engine, tender, and train and round the back of the observation car. The train has not yet been named.

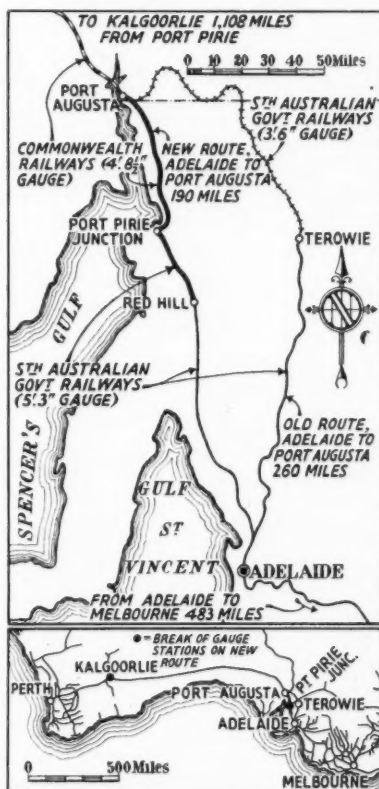
CHINA

New Constructions

The formation of the northern section of the Tatung-Poochow Railway has now been completed and platelaying is in hand. It is hoped to open this line throughout its entire length in October.

The surveys of the 250-km. trunk line from Canton across Kwangtung to Meih sien, and of the 120-km. Meih sien Chaochow line have been concluded, and the estimated cost of these lines is \$40,000,000. Construction work is beginning at once and should be completed within 18 months.*

* In common with notes to hand on a number of other important construction works, this was written before the outbreak of hostilities in China, and it is probable that funds will not now be available for such works. —ED., R.G.



Sketch maps showing old and new routes between South and Western Australia

THE TRANSPORT OF FOOD

Address to the British Association by the Research Manager of the L.M.S.R. on the problems of refrigeration and cold storage

MR. T. M. HERBERT, Research Manager of the London Midland & Scottish Railway, dealt with "The Transport of Food" in a paper of that title read before the Nottingham meeting of the British Association. The subject was treated chronologically—transport, such as it was, in the early days; present conditions; and some indications, more or less prophetic, of what it might be or ought to be in the future. It was not until the industrial revolution that the need arose for regular imports of staple foodstuffs. Wheat, of course, was the primary need; in 1840 this country imported rather more than a quarter of a million cwt., whereas by 1900 the imports exceeded 40 million cwt. Meat was later, and in 1870 imports were scarcely $\frac{1}{2}$ million cwt., rising to nearly 11 million cwt. in 1900. The increase in the quantities of perishables transported soon made some form of preservation necessary, beginning with the use of natural or water ice. Later, the question of refrigeration was for many years confined to sea transport; in the case of meat and, to a less extent, of fruit, considerable success was attained without any very full scientific understanding of the conditions. In later years, however, research has provided new and more exact methods, in which connection mention must be made particularly of the work of the Food Investigation Board of the Department of Scientific and Industrial Research.

The technical problem involved in the transport of perishables both by rail and by road was in essence that of producing a small mobile cold store, subject to severe restrictions in size and weight. The question was really one of maintaining a required temperature during a relatively short journey, and this could be done with comparatively small quantities of refrigerant, provided the insulation was adequate and the vehicle reasonably free of air leaks; such conditions were not easy to fulfil in a van or container with a relatively large door area, and subject to continuous stresses and strains, not to speak of conductive metal connections, bolts, and so on. Methods of refrigeration varied. The refrigerant might be natural ice or solid carbon dioxide ("dry ice"). For very large vans an independent refrigerating installation might be driven off the axle or with a separate power unit, though this was not usual in this country. The weight and cost of such an equipment was considerable.

In this country the common type of refrigerator van used water ice. This had the merit of cheapness, but the temperature so obtained was not sufficiently low for frozen meat or fish, while the drainage water was an inconvenient feature. For this reason solid carbon dioxide was being increasingly used. For the transport of milk there was a growing use of trucks, by road and by rail, holding 2,000-3,000 gall., lined with glass or stainless steel, and with sufficient insulation to preserve the contents at the desired temperature without refrigerant.

Regarding the future, Mr. Herbert said the role of prophet was a dangerous one, but the difficulties that existed today in transporting so many of our foodstuffs under the optimum conditions were largely difficulties of expense; and what was today a costly experiment would almost certainly be the accepted necessity of tomorrow. What should be aimed at in general was a continuous refrigerated or ventilated chain, in which the sea or rail journey was one of the links, between producer and consumer. We could, and did, provide transport under almost

ideal conditions halfway round the world, but this might be wasted effort if the food was allowed to deteriorate before loading or on arrival. There were difficulties but they were mainly economic. The ideal was a practicable one and would ultimately be reached. Public opinion would demand these results, which, it must be remembered, would have a productive return in the avoidance of waste and the improvement in public health.

Something of the kind had been started in France, where a company had been formed by the French railways to deal with the cold storage and refrigerated transport of perishables. It was true that France lent itself readily to the system, with the steady flow of meat, fish, butter, &c., from the north-west to Paris and Marseilles, and return loads of fruit and vegetables in the opposite direction; but this French experiment was undoubtedly a pointer to what we should ultimately reach in this country. Or possibly our problem might be met by some form of mobile unit, adapted to road and rail and used for a variety of purposes throughout the year. Smaller units might be used for collection or delivery, ending with the last link in the chain, the domestic refrigerator.

Burma Railways Report for 1936-37

The last annual report upon the Burma Railways as an integral part of the Indian State Railways system relates to the period ended March 31, 1937. There was little improvement in world commodity prices as affecting Burma agricultural produce, and real trade recovery in the province continued, therefore, to be slow and uncertain. A temporary rice boom in January and February, however, improved the earnings for the year, and, combined with a considerable reduction in working expenses, there was a diminution in the year's deficit, as compared with 1935-36, of Rs. 32,91,671. The net loss to the State during 1936-37 was Rs. 23,68,873 as against Rs. 56,60,544 in the previous year, a satisfactory achievement considering the adverse working conditions with which the railway had to contend. The following table gives the principal financial results for the last two years:—

	1935-36	1936-37
	Rs.	Rs.
Capital at charge	34,91,32,000	34,69,13,219
Gross earnings	3,73,47,759	3,82,74,101
Working expenses	2,83,36,139	2,64,52,527
Net earnings	90,11,620	1,18,21,574
Percentage of capital	2.58	3.41
Interest charges	1,46,72,164	1,41,90,447
Percentage of capital	4.20	4.09
Deficit	56,60,544	23,68,873
Percentage of capital	1.62	0.68

One of the principal improvements during the year was the speeding up of the Rangoon—Mandalay mail and express services by all but two hours, the new time for the 386 miles being 13½ hrs. Long halts are made for meals as no dining cars are run, and there are numerous intermediate stops. In connection with road competition, the overloading of lorries is notable, but three sets of portable wheel-weighers were purchased and supplied to the Police Department with salutary effect, many prosecutions and fines having resulted; one 3-ton lorry was found to be carrying 6 tons 15 cwt. Co-ordinated road and rail parcel services continued to operate successfully.

WELDING BULL-HEAD RAILS BY THE KATONA METHOD

Details of tests carried out on a series of 95-lb. rails joined together by arc-welding of the head and foot, and provided at the joint with mild steel slippers shrunk on and seam welded

IN the July 17, 1936, issue of THE RAILWAY GAZETTE, a description was given of a new type of partly welded rail-joint of Hungarian origin, known as the Katona joint, in which the only parts of the rails to be welded are the heads and feet, but a curved mild steel plate is shrunk on while in a heated condition to the feet of the rails, so forming a kind of slipper which, for additional security, is seam-welded to the upper side of the rail flanges throughout its length. Arc welding is used, various types of electrodes having been tried in order to obtain a suitable structure at the joint. In the same article details were given of various tests to which Katona joints had been subjected, and demonstrating that in freedom from brittleness they fulfilled all reasonable requirements, and were superior in shock resistance to certain other types of welded joint. The shrunk-on and seam-welded slippers, holding the feet of both rails, were, in particular, proved to be of material assistance in resisting the fracture of the joint under shock tests, such as the falling weight test.

Recently the London Passenger Transport Board, which has been conducting an extensive research into the cost and physical characteristics of various types of welded joint, decided to experiment with the Katona joint, and for this purpose dispatched to Budapest 20 pieces of bull-head rail of the 95 lb. B.S. (R.) section, each 2 ft. 6 in. long, for purposes of experiment. These pieces were in pairs, each pair taken from a different cast of steel. Half of the casts contained low percentages of both carbon and manganese, whereas the other half were of the British Standard medium manganese quality, save one, which was rather lower in manganese than the remainder. The chemical compositions were as follow:—

Cast	Type	Carbon	Manganese	Silicon	Sulphur	Phosphorus
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
K 28	A	0.42	0.76	0.17	0.020	0.030
K 29	"	0.41	0.77	0.16	0.021	0.029
K 30	"	0.42	0.77	0.16	0.022	0.029
K 31	"	0.42	0.77	0.16	0.021	0.029
K 32	"	0.42	0.69	0.18	0.022	0.030
K 33	B	0.53	1.05	0.12	0.026	0.045
K 34	"	0.52	1.05	0.12	0.025	0.045
K 35	"	0.53	1.08	0.14	0.025	0.043
K 36	"	0.53	1.08	0.12	0.025	0.044
K 37	"	0.55	0.82	0.12	0.020	0.040

A = Low carbon low manganese.

B = High carbon high manganese.

In the "A" group the Rockwell hardness figure varied from 38 to 43 kg. per sq. mm., and in the "B" group from 51 to 56 kg. per sq. mm. The arrangement with the patentees of the Katona joint was that each of these pairs should be welded together by this method, with slippers 200 mm. (7½ in.) long, and that each joint should

then be subjected to hardness tests along the rail-head through the welded zone, and then to either a bending test, or to a shock test in a falling weight test machine. Re-heating after welding, if applied for annealing purposes, was to be up to 800° C., at which temperature the joint was to be held for 15 min., followed by slow cooling in sand or an annealing chamber. Actually the welds were cooled out in sand at about 100° C., but no post-heating was applied. These rails were, incidentally, the



Result of bending test

first bull-head rails that have been joint-welded by the Katona process.

The hardness tests on the rail-heads were made in pairs, respectively 12.5, 25, 50, 100, and 610 mm. from the centre of the joint. The average hardness curve rose fairly evenly to a peak at the centre of the joint, but certain of the individual joints displayed much more abrupt changes. For example, in rail K.29, between the 12.5 mm. and 25 mm. position on one side of the joint there was a drop from 242 to 183 (in Brinell hardness figures); K.28 was more extreme, with 210 in the centre, 129 at 12.5 mm. to the right and 174 at 25 mm. to the right, also 174 at 12.5 mm. to the left and 226 at 25 mm. to the left, indicating considerable hardness variations in no more than 50 mm. (2 in.) of distance. With the high carbon-high manganese rails there were still greater extremes; K.35 showed 264 at the centre, 186 12.5 mm. to the right, and 227 25 mm. to the right, while on K.36 181 at the centre of 12.5 mm. to the left was succeeded by 252 25 mm. to the left and 181 again 50 mm. to the left. Scarcely any of the rail-heads were entirely free from somewhat capricious variations in hardness of this description, which were the least satisfactory aspect of the testing.

Bending tests were conducted on two joints out of each group. Each joint was carried head up on supports 3 ft. 6 in. apart, and was subjected to a gradually increasing load in the centre transmitted through a block curved to a radius of 10 cm. (4 in.). Deflections were then read at each 10,000 kg. (a shade less than 10 tons) increase in the load. Of the joints in group A (low carbon-low manganese) K.30 and K.31 were loaded up, the former to 60,500 kg. (59½ tons), and the latter to 56,000 kg. (55 tons) without any fractures or cracks appearing in the joint. Up to 30,000 kg. (29½ tons) the deflections were 3.55 and 5.20 mm. respectively and there was no permanent set; but at 38,000 kg. (37½ tons) the elastic limit was passed, and on the removal of the load the permanent deflections were 57.0 and 44.4 mm. respectively. Of the joints in the "B" group (high carbon-high manganese)

K.35 was subjected to a very severe test. At 40,000 kg. (39½ tons) the deflection was 7.1 mm.; the elastic limit was passed at 47,000 kg. (46½ tons), and loading was then continued to 65,000 kg. (64 tons), when the permanent set amounted to 34.5 mm. The load was then taken off and loading recommenced. By 60,000 kg. (59 tons) 8.5 mm. had been added to the deflection, but at 64,000 kg. (63 tons), one of the slipper seams began to open up. The load was then dropped to 18,000 kg. (17½ tons) and the seam held. The final permanent set was 45.2 mm. K.36, the other joint in the group, deflected 7.2 mm. at 40,000 kg. (39½ tons), and after the elastic limit had been exceeded at 45,000 kg. (44½ tons), had deflected 16.7 mm. at 50,000 kg. (49½ tons) when at 52,000 kg. (51½ tons) the rail broke clean through at the end of the slipper. It is not without significance that this joint was one which had displayed some of the most extreme variations in Brinell hardness after the welding had been carried out.

In the falling weight tests the welded joints were again carried head up on supports 3 ft. 6 in. apart; a tup of 500 kg. (1,102 lb.) was employed, and was dropped from a height of 6 ft. Of the rails in the "A" group K.28 showed a deflection of 7 mm. after the first blow and broke on the second. K.29 sustained two blows, but was then broken accidentally by the tup falling on it while it was lying on its side. K.32, however, sustained nine blows in succession without fracture or any sign of cracking, and at the end of this severe test had deflected 61 mm. Of the "B" group K.33 sustained two blows, with a deflection of 16 mm., but fractured on the third, and K.37 three blows, with a deflection of 21.5 mm., after which it fractured on the fourth. K.34, however, sustained eight blows, there being no sign of cracking until after the seventh, when the deflection was 46.5 mm.; at the sixth blow the deflection of 36 mm. compared with 55 mm. in the case of the "A" group rail K.32. At the seventh blow the seam on one side began to open up, and by the eighth blow had extended to the rail-head, though the joint was still holding together with a deflection of 73 mm. Thus none of the six joints was fractured at the first blow, and five withstood two blows without fracture.



Result of tup test

As regards the time occupied in carrying out the welds, 5 min. sufficed for cutting out the portion of the head and feet of the rails to receive the deposited weld metal, and 50 min. on the average was spent on welding the head and foot. Mounting the slipper occupied 4 min. and welding the seams on both sides, with the side plates, occupied 48 min. A further 12 min. was spent on trimming the weld to a smooth surface on the top of the head, over which the running takes place. The total time per weld was thus roughly 2 hr. Materials required included the slipper, bent round from a mild steel plate 7½ in. long, ⅞ in. thick in the centre, and ⅝ in. thick at the edges, and two side plates 3½ in. × 1 in. × ⅞ in., cut to a half-round shape on the upper side; 23 thickly coated and 5 uncoated electrodes 4 mm. dia. per joint; 6 kW. of current for the welding machine, oxy-acetylene gas for cutting out the head and foot and certain minor costs. Microscopic examination of the welds showed that the structures and the transition zones to the unaffected steel were homogeneous and generally of excellent quality. The tests thus reveal that a reasonably dependable welded joint can be made with bull-head rails by the Katona method.

Lübeck-Büchen Railway 1936 Results

A FURTHER increase in traffic, goods and passenger, was recorded by the Lübeck-Büchen Railway Company in 1936, but as a large percentage came under special rates, the receipts did not rise proportionally. How far the completion of the Hamburg-Lübeck *Autobahn* will affect the railway in future remains to be seen. Considerable progress has been made with the seven year plan for bringing the line and its equipment up-to-date and overtaking maintenance arrears. The introduction of the express push-and-pull units, composed of a streamlined tank engine and articulated double-deck carriage set, between Hamburg and Travemünde, has proved very successful. Two of these sets are in service, and six more are to be at work this year. A sum of 3,690,000 RM. has been spent on renewals, 1,760,000 RM. being charged to revenue, and the rest to reserve account. Working receipts came to 14,250,000 RM., an increase of 15.9 per cent. Passengers carried were 6,540,000, or 14.7 per cent. more, with a rise of 9.6 per cent. in receipts to 5,620,000 RM. Tonnes of goods amounted to 2,890,000, an increase of 17.9 per cent. Under all these headings the percentage increases were better than the corresponding figures for the Reichsbahn. Operating expenses, excluding money paid to reserve, were 14,010,000 RM., or 1,310,000

RM. more than in 1935; there was an operating surplus of 19,567,000 RM. Staff employed totalled 2,610, a small increase; also about 300 employees of contractors were engaged on permanent way work.

The company has followed the policy of the Reichsbahn in the matter of cheap fares and rates and general facilities. With certain exceptions ordinary freight rates were raised 5 per cent. During the year some 14 km. (8½ miles) of main line were relaid with heavier rails, and 15 km. (9.3 miles) were re-ballasted, re-sleepered and equipped with new fastenings; lock-and-block apparatus was introduced between Lübeck and Travemünde. Speeds up to 120 km.p.h. (74½ m.p.h.) are now allowed between Hamburg and Lübeck; thence to Travemünde the limit is 85 km.p.h. (53 m.p.h.). Through carriages to Dresden and Munich run in certain trains. The company has disposed of some dock property and also the sleeper impregnating plant at Lübeck. Reserve funds amounted to 2,389,803 RM. at the end of the year, and the balance sheet showed a total figure of 65,500,845 RM., the value of the undertaking being put at 61,853,739 RM. Following the death of a director, Herr Heye, the shareholders have appointed two new ones, Dr. J. Schlinck of Hamburg and Dr. Ott of Garmisch, a former General Manager.

SIGNALLING ON THE GERMAN STATE RAILWAY

A brief survey of German signalling development and modern methods indicating rapid progress towards perfecting the safe and speedy working of trains

THE working of the trains on the German State Railway is conducted throughout on the space interval principle, or absolute block system, in the sense in which that term is used in Great Britain, aided by the interlocking of points and signals; the equipment used is everywhere excellently constructed and well maintained. The signal aspects are few, simple and easily understood, and although some small differences are to be found in this respect between various parts of the system, there is little, if any, in the fundamental ideas on which they are based, so that a large measure of uniformity already obtains. This is rapidly increasing and it is expected that standardisation will be completed within the next few years.

Stop Signals for Running Movements

Semaphore signals of the two-position type are used for all purposes where a home or starting signal is seen in Great Britain. Advanced starting signals are almost unknown. The arm moves from horizontal to 45 deg. in the upper right-hand quadrant (the trains run right-handed) and exhibits a red light for "stop" and a green for "proceed." It is coloured red and white in front and black and white at the back. Where junctions or turnouts occur, a second—at times also a third—arm is provided below the first but normally in line with the post and practically invisible, its light being obscured at night. To signal a movement over the diverging route both arms are inclined at 45 deg. and two green lights are shown, or three arms at 45 deg. and three green lights for a further diverging route. Originally, on the Prussian State system, the largest independent State system before the formation of the Reichsbahn in 1920, these "proceed" aspects were regarded as route indications, their meanings being fixed for each place and made known to the drivers. On some of the other State lines the three-armed signal was not used, the two-armed aspect having the meaning of "proceed at reduced speed" over any route requiring such action. It was accordingly decided in 1929 to adopt the speed signalling principle for the whole railway, and on February 17, 1930, both the two- and three-armed aspects were given that meaning, the latter with the qualification "on a route other than that governed by the two-armed aspect." No more three-armed signals are in consequence to be installed.

Where it is considered essential to provide some indication of the route set up, route indicators are now being used. One result of this system of aspects is that a driver who takes the high-speed route at all places sees the same "proceed" aspect everywhere, and that all stop signals look alike when at "danger." An unusual indication appears only when a speed reduction is called for. There are, of course, many signals having two arms which always work together. Many of the starting signals on the Bavarian lines have a third position for the arm, vertically downwards, with a blue light at night. This is called "normal" (*Ruhe* = rest) and means that no running movement is expected on, or is ready to leave, the line concerned, so that the latter is free for shunt movements. This signal aspect will now gradually be done away with.

Backlights of signal lamps are white (milk glass) for "on," and a small white light for "off."

Distant Signals

Distant signals are discs, in order to obtain as great a distinction as possible between them and stop signals, and revolve on a horizontal spindle to present their edge when "off." Unless carried on brackets or gantries, they are mounted on short posts, bringing the disc on a level with the driver's eye. To mark the site of the signal when the disc disappears, a white signboard, with black V-marks, point to point, is placed close by, and there are three white warning approach boards in rear, the first the driver meets being 250 m. (820 ft.) from the signal. The discs are coloured yellow and show two yellow lights, placed diagonally, when "on" and two green when "off." For many years the distant signal was cleared with the stop signal ahead, whether the latter called for speed reduction or not. This became increasingly unsatisfactory. After extended trials with various designs, a new three-aspect distant signal was officially accepted as standard by the Minister of Transport on April 21, 1933, and has since been extensively installed, particularly on those main routes where speeds have been raised, while the distance between distant and home signals has been increased to 1,000 m. (1,094 yd.). This signal has a pointed red and white semaphore arm, with central pivot, below the disc and normally in line with the post. When the stop signal ahead shows "proceed at reduced speed" the disc remains displayed and the semaphore moves to the 45-deg. position, a reflected green light appearing below the upper yellow light. The other indications remain as before.

The distant signals used on the Bavarian lines were peculiar in that the disc folded in two when "off" and formed a small semaphore at 45 deg., but this pattern is now disappearing. A distant signal in rear of a home signal works with the latter only—generally simultaneously—another one being used to repeat the starting signal. This, called the "departure distant" (*Ausfahrersignal*), is sometimes worked by electric motor, and spring and vacuum power mechanisms are also in use. Some ordinary distant signals a long way from the signal box are also power-operated. Spectacle glasses, in all signals, are very generally made movable and lowered in the daytime, so as to remain stationary, and the lamps can be raised and lowered from the foot of the post. Propane gas long-burning lamps have been introduced for distant signals in recent years, and at some large stations electric signal lighting is used.

Point Indicators and Shunt Signals

Except where there is no shunting, say at running junctions, points are equipped with indicating lanterns exhibiting milk glass signs. A special one, with combination action, is used for a set of double slip points, to avoid a multiplicity of lanterns. Ground shunt signals, as understood in Great Britain, are not seen. This method of working necessitates the use of so-called shunting prohibition signals, to limit shunt moves at certain places when

necessary and protect running movements against them, when it is impossible to do so by setting some points as a trap. They resemble the English banner signal, and have a black bar, horizontal or inclined, on a milk glass background. When "on" they order an absolute stop and must not be passed to the smallest extent by any movement whatever, whereas the ordinary running stop signals may be passed by shunt movements under proper conditions. As these signals when "off" are not an instruction to move they are frequently supplemented by "wait" and "draw forward" signs, to obtain an equivalent of the shunt signals used in other countries. The "wait" sign is a large letter "W" (*warten* = wait), painted yellow, mounted on the shunting prohibition signal, or at times separately; the "draw forward" sign is composed of white lights forming the letter "V" (*vorrücken* = draw forward) and when alight gives the order to shunt past.

To bring running movements past an ordinary stop signal at "danger," a written order is usually necessary, but where it might be inconvenient to give one, a verbal order, or hand signal, suffices at signals marked with a red letter "M" (*mündlich* = verbal). Some signals carry a permissive, or call-on, indicator, in which three white lights are considered to form the letter "A," which can be lighted under time-interval control from the signal box (A = *Befehl A*, = order A), replacing a written or verbal order.

Colour-Light Signals

Colour-light signals, replacing the ordinary running signals, have as yet been used only to a limited extent, but one complete installation has been in use for some years on an electrified section in Silesia, the experience with which has proved very valuable. Multiple aspect colour-lights are seen on the Berlin city and ring lines, as mentioned below.

Operation of Signals and Points

The standard mechanical apparatus is the double wire system, although rod working is still used in places, such as Baden, where it was formerly favoured. Standard designs are now available, but much old equipment remains from the days of the separate State railway systems. All points are trailable and fitted with either the toggle or hook type locking. For the latest standard points with long tongues, for use at high speed junctions, &c., a modification of the hook lock called the claw lock has been introduced. All facing points are, of course, properly detected. Mechanical locking bars are largely replaced by electric route locking, and track circuit point locking is also found. Wire transmissions have solid steel wires, with wire ropes at turns and round the mechanisms, and are compensated. Ground mechanisms have wire breakage locks, with corresponding signal locking in the signal box; the latter is also set in action when points are trailed. Attention is being given to working points at much longer distances than used to be customary. Signals are mostly operated by cam-plate mechanisms, ensuring good indications at all times and smooth working of the arms and discs. Key interlocking apparatus is used at some stations, or provisionally during alterations.

Interlocking and Block Working

There are 17,800 mechanical signal boxes. The frames are of the lever and drum type, save at some small stations where the crank handle type is met with. Point levers are generally free to be moved in any order with signals at "danger." Interlocking is moved by small handles called route handles (*Fahrstrassenhebel*), which must be

operated before the relative signal lever is free to be pulled. There is thus practically no conditional locking. The route handle must usually also be electrically locked reversed before a clear signal can be given, thus securing the road. Block working inside station limits is controlled by an official called the *Fahrdienstleiter*, who sanctions every movement. If he is stationed in a signal box, that is called a "directing signal box" (*Befehlstellwerk*), any others at the same station are subordinate to it.

Between stations lock-and-block apparatus is used, on double and single line, except where traffic is light, when the telegraph message system suffices. The block is worked by a.c. from magneto generators, or motor generators at busy places. A certain amount of d.c. station block equipment may, however, be seen. There are many intermediate block posts, often controlling crossing barriers. The separation between section and station block makes numerous signal replacers necessary. Treadle release for the block is often combined with an insulated rail to obtain a last vehicle action, especially for route locking. Track circuiting is found at many stations, but the large use of steel sleepers has led to the development of axle-counting apparatus, now installed at a number of places. Trials are also being made with an optical tail signal detector. On double lines the block is worked on the normally free system.

Bell Signalling : Emergency Telephones

There is no block bell signalling, as understood in Great Britain, the lock-and-block being worked without it. Train description and other messages are sent on Morse inker instruments, of which much use is made. Bell communication of a special form exists from station to station, or at times from some more important one to another, or to a junction. Large signal gongs called *Läutewerke* are placed at such stations, with others on the same circuit at intermediate block posts, small stations, crossings, platelayer's huts, &c. Every down train departure is signalled by 5 blows; every up train departure by 5 blows given twice. An emergency signal of 30 blows orders all who hear it to take instant measures to stop the traffic. Telephone boxes are placed every kilometre ($\frac{1}{2}$ mile) on all main routes, arrows on the telegraph posts showing which way to run to reach the nearest. From these, at any hour, a responsible official at a bell signalling station can be spoken to, and on learning of an accident his first duty is to give the emergency signal.

Automatic Block Signalling

Automatic signalling is in use on the Berlin City line, and certain ring and local line sections, with multiple-aspect light signals and train stops. The latter are also fitted to the ordinary signals on these lines where still in use. The "stop and stay" indication is one red light, the other aspects being composed of two lights arranged horizontally thus:—

Stop and proceed	..	..	..	Yellow, yellow
Caution	..	..	..	Green, yellow
Proceed	..	..	..	Green, green

The ordinary "proceed at reduced speed" can be given by green over green, and as the right hand half of the signal refers to the second section in advance, combined indications can be arranged. When a "caution" indication is at less than braking distance from the stop indication in advance, an illuminated white arrow, the "braking arrow" (*Bremspfeil*) is seen on the signal. The green lights in these signals have a grass green tint, which has been found better than the so-called signal green. A "stop and proceed" signal can be passed when the guard,



"Wait" sign with "draw ahead" lights at exit to siding, showing points, point indicators and signal box, Berlin electric line



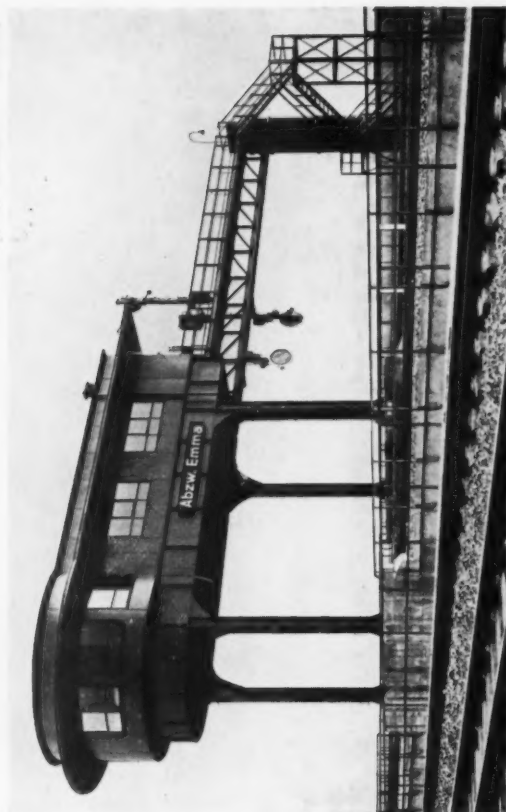
Two-armed stop signal, with signal box and turnout beyond, 3-aspect distant signal repeating next signal ahead, and A.T.C. track magnets



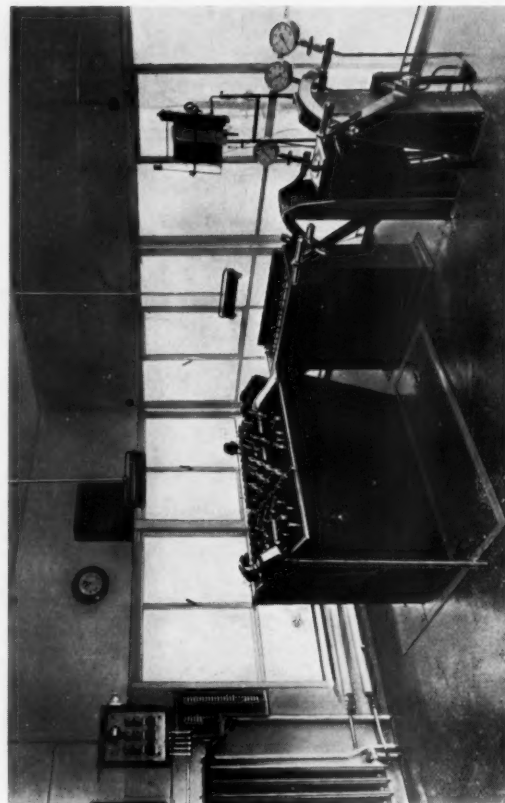
Colour-light signal on the Berlin City Railway for automatic or controlled working



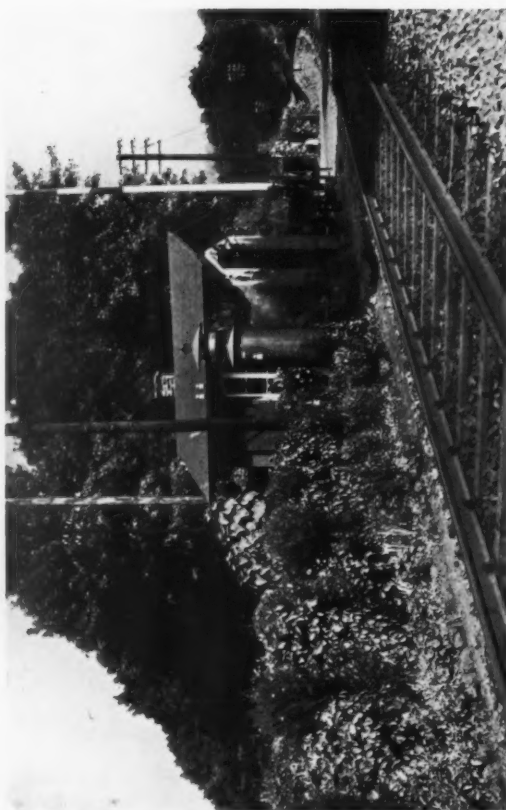
Shunting prohibition signals in "stop" position and running signals beyond. Note fouling point markers



Typical modern power signal box at Emma junction, Dusseldorf, constructed of steel



Interior of hump yard cabin, Wanne-Eickel, showing desk frame and rail brake controls



Level crossing barrier and watchman's hut, showing large signal gong



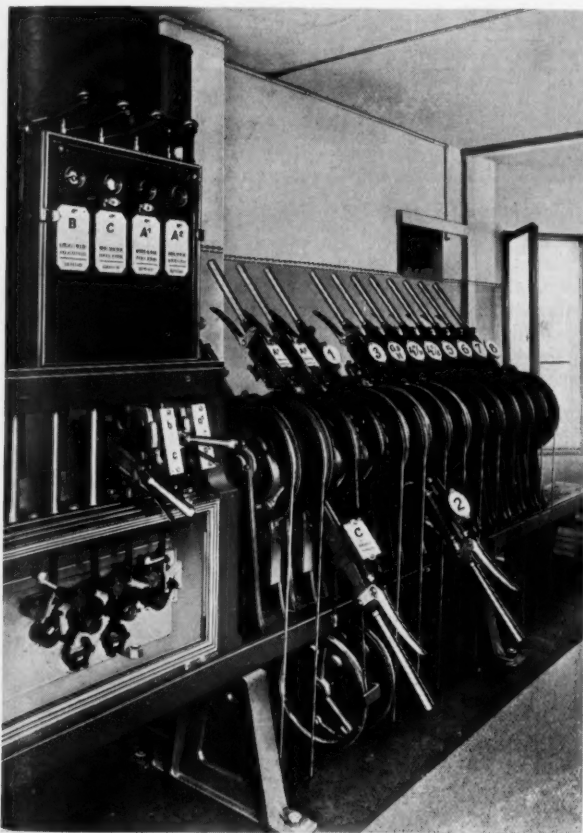
Interior of power signal box at Dortmund, showing "multiple row" locking frame

SIGNALING ON THE GERMAN STATE RAILWAY

who rides in the front of the train, cancels the train-stop action. The operation of signals, train stops, and track relays is proved in turn and "A" and "V" signs are provided on certain signals to facilitate traffic. Power signal boxes are in general use on these sections, and magazine describers, operating platform indicators.

Power Signalling: Hump Yards

There are 1,300 power signal boxes, of which 1,250 are electric, and the rest electro-pneumatic. Some date from many years ago. During the last few years the "multiple row" frames, in which the handles are grouped in rows, so effecting a great saving of space, have been installed, and some very neat signal boxes have replaced the older ones. Mechanical locking has so far been usually retained, but the absence of conditionals makes it comparatively simple. The signal mechanisms not only have a clutch but are returned to normal by power. The block



Standard type of double-wire locking frame showing block apparatus on left, route handles beneath, and below them the locking mechanism connecting the block with the levers

working is combined with the power frames in several ways; lamp indications are being increasingly used. The ordinary a.c. block apparatus in power boxes is sometimes worked from a distance by solenoid action. For the hump yards, of course, desk pattern frames are often used. Hump yard working has been the object of much special research and there are many yards, some of the most important in Europe, in service, with magazine point control and various types of rail brakes. Wireless is used in some cases for communicating with the hump yard

driver. Goods services have been speeded up and considerable economies achieved by these installations.

Automatic Train Control

The Reichsbahn has done more than any other railway in Europe to develop and instal A.T.C., having equipped considerable lengths of main line route with the intermittent inductive system, as described in THE RAILWAY GAZETTE for September 7, 1934, and May 1, 1936. The optical system is also undergoing extensive trials on other sections. Visual cab signals are not used; the working is based on the vigilance principle and direct observation of the fixed signals. The driver's action is not interfered with unless he fails to acknowledge an adverse distant signal when he passes it by pressing a vigilance button, or to reduce speed in time in accordance with the signal indications. The observation of permanent way and other speed restrictions is enforced, and absolute stop signal action is provided, thus meeting a very complete operating programme. The equipment has been fitted to some of the high-speed diesel railcars with most satisfactory results.

Telegraphs and Telephones: Light Railways

The Reichsbahn's telegraph and telephone systems are of the most complete description, with much apparatus of the most modern type, including high-speed telegraphs, automatic telephones, carrier transmission, and some wireless services. Telephone communication with certain express trains is also provided. There are also many electric clock and time signal installations, and subsidiary devices. Train despatching, or traffic control, has been adopted on some important sections with excellent results, as recorded in THE RAILWAY GAZETTE for November 11, 1932, enabling doubling or quadrupling of lines to be avoided and many economies to be made.

The light, or secondary, lines (*Nebenbahnen*) are of course worked with simpler equipment than the main routes, but in recent years a certain amount of standard signal equipment has been adopted to enable speeds to be raised, the better to meet road competition. Special simplified regulations apply to these lines, on which are found many level crossing warning signals of the flash-light pattern.

Apparatus in the Verkehrs-Museum

Those wishing to understand German signalling more fully should not fail to visit the Verkehrs- und Bau-museum, Invalidenstrasse, Berlin, where there is a fine collection of apparatus and every detail may be studied. For the illustrations in this article our best thanks are due to Dr. Sommer, of the Reichsbahn Press Service in Berlin. An editorial article appears on page 433.

THE P. & O. CENTENARY.—A shipping centenary of some railway interest is that of the P. & O. Company, now being celebrated. It was in the first week of September, 1837, that the P. & O. pioneer, *Iberia*, sailed from Falmouth for Spanish waters and Gibraltar, connecting at the latter point with the mail service to the East then maintained by the British Admiralty. Some three years later, a start was made with accelerating the service to Marseilles by using as much of the railway as was then open, in conjunction with mail coach services. Such was the beginning of the present luxurious P. & O. Overland Express, now connecting, of course, with the P. & O.'s own mail services to the Orient. The genesis of this train is one of the many aspects of P. & O. development dealt with in a handsome centenary booklet issued by the company.

LOCOMOTIVE WEIGHING MACHINES, L.N.E.R.

New plants recently laid down at Doncaster and Darlington

THE locomotive weighing machines of the London & North Eastern Railway at Doncaster and Darlington having become too small to deal with the largest modern engines, Sir Nigel Gresley, the Chief Mechanical Engineer, investigated the most recent weighing machine practice, and decided that the design incorporating separate weighing units for each wheel had many advantages over the old type of table as regards

mechanism of one of the units is shown diagrammatically in Fig. 2. On the top of the supporting bracket of each machine there are two ball bearing mounted rollers, which are shown in Fig. 4. These are brought under the wheel flanges and are screwed up the inclined planes until they are hand tight on the wheel flange, and symmetrically disposed on each side of the vertical centre line of the wheel. The lifting gear

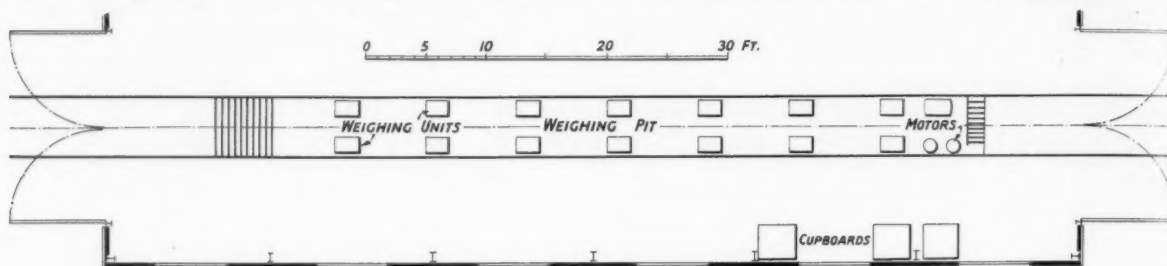


Fig. 1—Arrangement of weigh house in plan

accuracy, sensitivity and speed. Ransomes & Rapier Limited was therefore commissioned to design and build the weighing machines required; that at Darlington was completed in 1934, and the machine at Doncaster in 1935.

Fig. 1 shows the arrangement of the weigh house at Doncaster. Fig. 3 gives a general view of the weighing units in the pit, showing the fourteen individual weighing units provided, this number being sufficient to cover the wheel arrangements in use on the London & North Eastern Railway. Every weigh unit is capable of taking a wheel load of 12 tons, and is mounted, through the medium of four small flanged wheels, on rails accurately laid on a substantial concrete foundation. These rails extend the full length of the pit and allow the units to be moved longitudinally to accommodate the various wheel bases of different locomotives. The units are of the steel-yard type, with a main beam graduated in tons, and an auxiliary beam on each machine is graduated in hundredweights and pounds. The machines are illuminated by a system of indirect lighting housed in the wall of the pit, and by an individual lamp on each machine directly over the weighing beam. A locomotive can be either drawn or propelled, or can come on to the pit by means of its own steam, and when stationary the machines are set to suit the particular wheel-base.

The weighing and lifting

is then put into operation. This gear, which comprises a 5-h.p. electric motor, together with a control gear, &c., is shown in Fig. 5. The drive is through worm reduction and bevel gearing to a horizontal shaft on each side of the pit, which operates the lifting mechanism within every unit simultaneously. By this means the whole

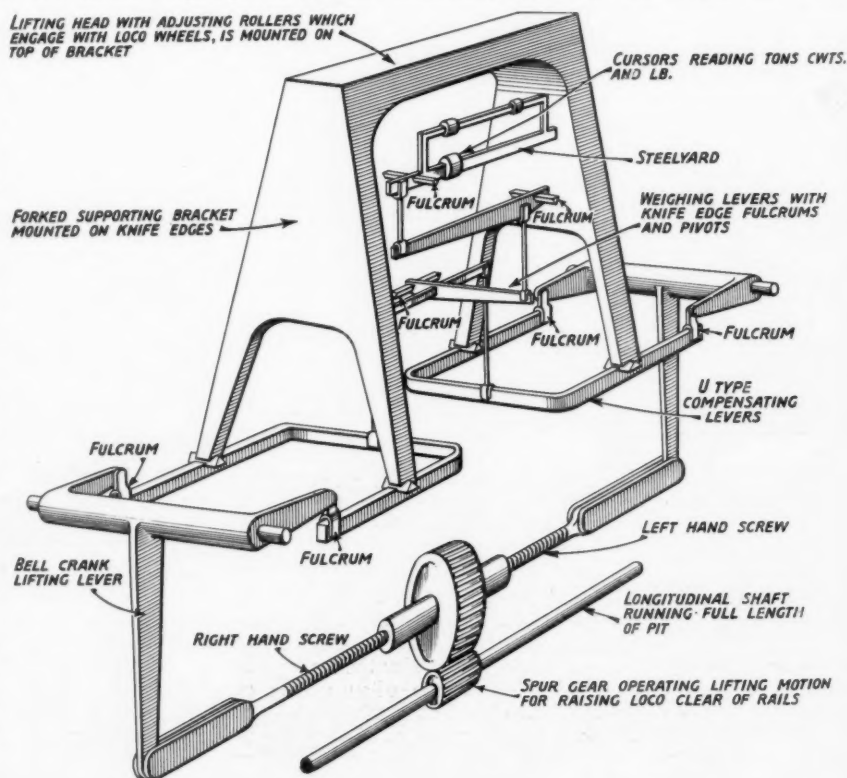


Fig. 2—Weighing and lifting mechanism of one unit

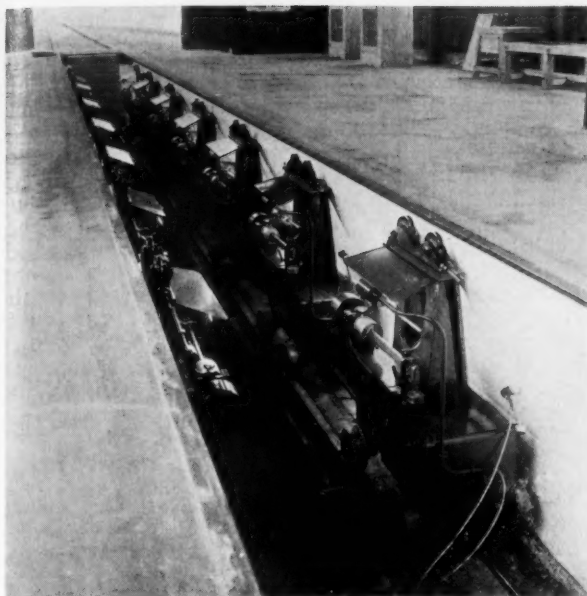


Fig. 3—General view of weighing units in pit

engine is lifted clear of the rails and is supported by its wheel flanges on the weighing units. The electrical gear is automatically cut out when the engine is lifted the requisite amount, and the engine can be raised or lowered through hand ratchet gear when no power is available. Adjustment in the weight distribution is then made while the engine is in position, until the weight on all wheels is correct.

Fig. 6 shows one of the streamlined "Silver Link" Pacific type engines being brought into position on the weigh table, and on the following page are given the sample weights noted in tabular form.

The average time required to weigh an engine of this type and adjust the weights on all wheels is two hours,

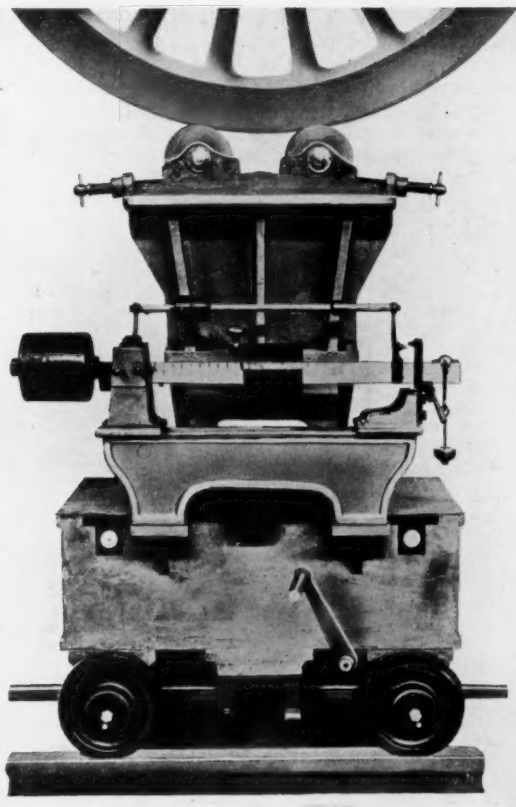


Fig. 4—Engine wheel in contact with ball bearing rollers

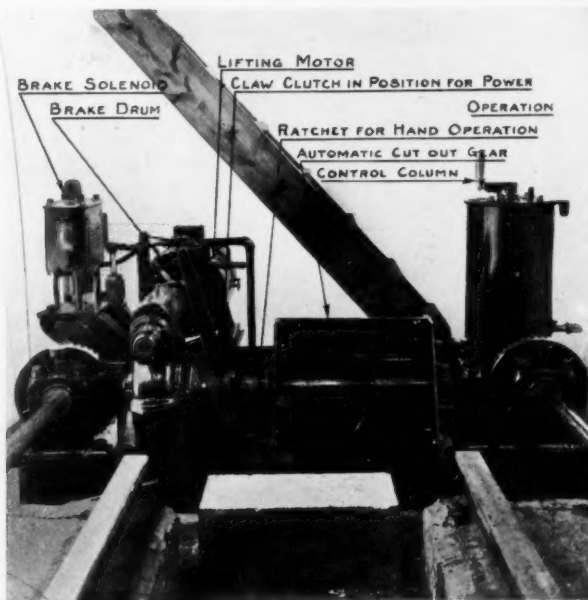


Fig. 5—Lifting gear with motor drive

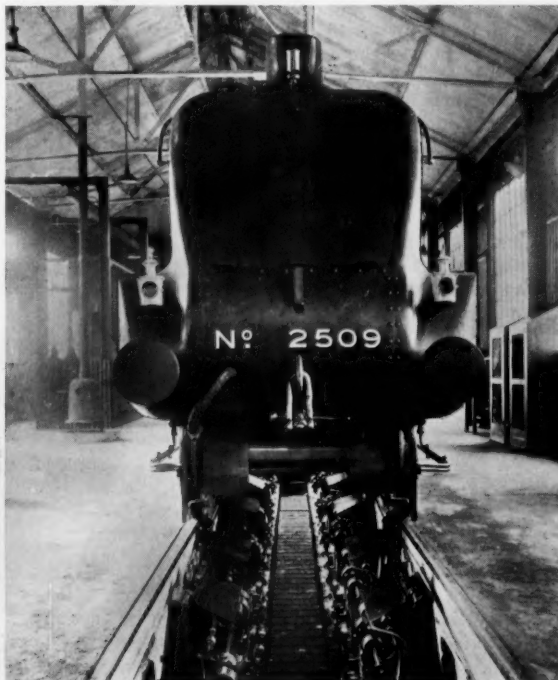


Fig. 6—Front view of locomotive on pit

two-thirds of the time being spent on the engine, and the remaining one-third on the tender. The accuracy of the machine is shown by the fact that if any engine is weighed, taken away, brought back and reweighed, the difference in the weights is not greater than $\frac{1}{8}$ of 1 per cent. The sensitivity of the machine is such that the axle weights are affected by the relatively small additional weight of a man climbing on to the engine.

One of the many advantages of this special design of weighing machine is that as every locomotive wheel

		Left hand			Right hand			Totals		
		Tons	Cwt.	Qr.	Tons	Cwt.	Qr.	Tons	Cwt.	Qr.
Bogie—										
Leading wheel	..	5	2	0	5	1	0	10	3	0
Trailing wheel	..	5	2	0	5	1	0	10	3	0
Coupled wheels—										
Leading wheel	..	11	0	0	11	1	0	22	1	0
Driving wheel	..	11	0	0	11	0	0	22	0	0
Trailing wheel	..	11	2	0	11	1	0	22	3	0
Trailing carrying wheel	.. ..	8	7	0	8	6	0	16	13	0
Total, engine								..	103	3 0
Tender—										
Leading wheel	..	7	19	0	8	1	0			
Second wheel	..	7	19	0	8	1	0			
Third wheel	..	8	2	0	8	1	0			
Trailing wheel	..	8	3	0	8	2	0			
Total, tender								..	64	8 0
Total, engine and tender									167	11 0

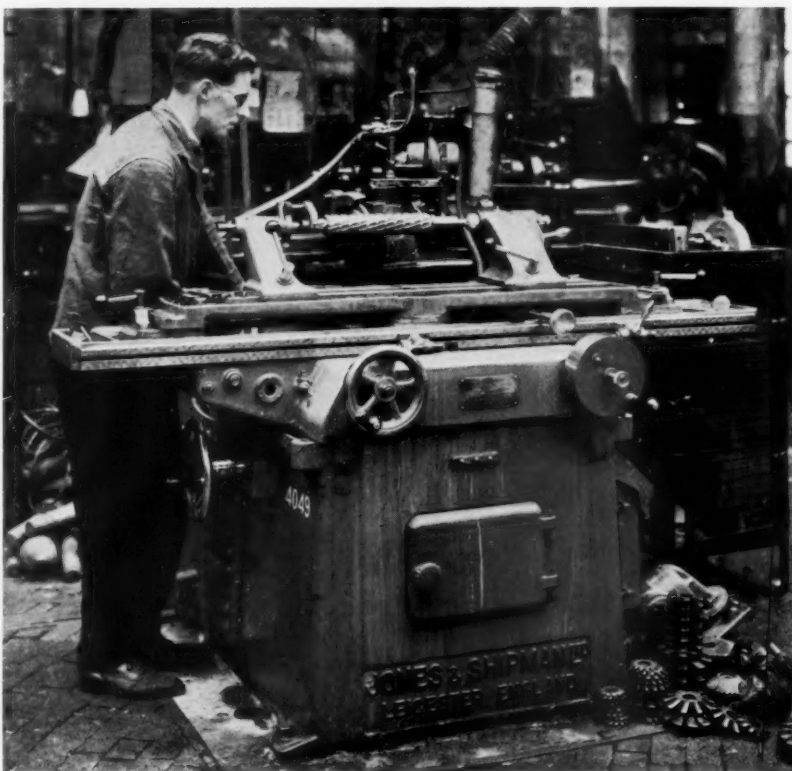
is supported on its own weighing unit, and as every unit is placed immediately under the centre of the wheel, cumulative errors, due to unbalanced stresses in the weighing machine parts, are not introduced. Every weighing unit carries its load on knife edge supports. The load is completely balanced within the system of knife edge pivoted levers, so that there are no guides, bearing or rubbing surfaces which can introduce speculative or variable frictional resistances. The locomotive wheels may be turned whilst supported on the weighing units, so that the balance at all positions of the cranks can be checked. The effect of an adjustment to the weight on one wheel on all the other wheels is shown immediately on the other weighing units. The whole of the mechanism is below rail level, and the shed is not obstructed by it in any way. The locomotive track over the wheel load indicators is independent of them, and so provides a through road when the machine is not in use.

The minimum axle spacing that can be dealt with on the weighing machine is governed by the space occupied by the individual weighing units: this space is relatively small and is less than the minimum axle spacing met with in locomotive design. It will be realised that, with weighing machines of this type, any class of engine not exceeding the maximum length of the pit, nor with more wheels than the number of weighing units provided, can be weighed.

A New Tool Grinding Machine

THE illustration we reproduce* shows a Jones & Shipman new motorised 12-in. by 24-in. cutter and tool grinder recently installed at the Crewe works of the L.M.S.R., where it is engaged on grinding various types of milling cutters for precision work. The conditions vary with every job, and consequently it is not possible to give production times for this machine. It is, however, understood that they are satisfactory in all respects. Features of the machine are a compact column, machined underneath and with a spread base. The heavy table and slide guarantee extreme rigidity, and a feature that we noted with interest was the effortless operation of the table, which moves with a touch of the finger. The table traverse is dual controlled from both front and rear of the machine, and the cross feed of the carriage to the wheelhead also has dual control. The motor driving the wheelhead is fixed at the base of the circular pillar carrying the head, a location which ensures permanent tension to the belt, and correct tracking in every position.

By these means a wide range of cutter-grinding work can be handled; the specially designed tailstock, giving a definite rake angle to the cutters, is a feature worthy of note. Cutters up to 21 in. dia. can be accurately



sharpened on an additional workhead, which, however, is supplied as an extra when required. Tests show that tools ground on this machine may have anything up to 25 per cent. greater cutting efficiency.

* By the courtesy of Mr. W. A. Stanier, Chief Mechanical Engineer, L.M.S.R.

RAILWAY NEWS SECTION

PERSONAL

FRENCH NATIONAL RAILWAYS

M. Guinand, Chairman of the Board of Administration of the French National Railways Company, was appointed General Secretary of the Ministry of National Defence in 1932, and later became General Controller of the Army Administration. He was appointed Chief President of the Cour des Comptes on September 2, 1936. On July 1, 1933, he was awarded the Grand Cross of the Legion of Honour.

M. Grimpret, Vice-Chairman of the French National Railways Company, has been Chairman of the Board of the State Railways since June 12 this year. Prior to that time, he had been Directeur des Chemins de fer au Ministère des Travaux Publics, and then General Secretary of the ministry. M. Grimpret is a Commander of the Legion of Honour.

M. Raoul Dautry, who retired on June 12 from the general managership of the French State Railways (see THE RAILWAY GAZETTE of May 28), is to be appointed to one of the two vacancies for directors on the board of the new French National Railways Company, mentioned in our issue last week. As then stated these places are to be filled by persons "who have rendered eminent railway service."

M. Robert Le Besnerais, General Manager of the Northern Railway Company, who, as recorded last week, becomes General Manager of the French National Railways Company, is 44 years of age. He was educated at the Ecole Polytechnique and the Ecole des Mines, and entered the service of the Northern Railway Company in 1924.

M. Surleau, Assistant General Manager of the French National Railways Company, was formerly Ingénieur en Chef des Services de la Voie of the State Railways, and for many years collaborated with M. Raoul Dautry, then General Manager. In November, 1935, M. Surleau became General Manager of the Alsace-Lorraine Railways. Since July 13, 1937, he has held the post of Technical Commissioner at the Paris International Exhibition.

The King has awarded Imperial Service Medals to 49 employees in the Canadian Department of Transport.

Mr. H. R. Cripps, who retires on October 1 from the office of Chief Assistant Solicitor, London & North Eastern Railway, was born in 1873 and educated at Winchester. He was for some time in the Chambers of the late Lord Moulton, and in 1897 joined the firm of Messrs. Dyson & Company, becoming Senior Partner in 1913. Mr.

legislative measures relating to railways, particularly with the Railways (Valuation for Rating) Act, 1930, and the negotiations preceding it. He also took a leading part in the litigation arising under that Act, and it was due largely to his initiative that the recent agreement with the rating authorities became possible. With his retirement

another link with the past is severed, for Mr. Cripps has been a prominent figure in Westminster for more than 40 years, beginning his career when Sam Pope Q.C., Pember Q.C., and Bidder Q.C., were at their zenith as Counsel, and Sir Theodore Martin, Sir Frederick Bramwell, and Sir John Wolfe Barry were names with which to conjure.

Bequests of £1,000 to the Railway Benevolent Institution, and of £500 to the Railway Servants' Orphanage, Derby, were made in the will of the late Mrs. Mary Elizabeth Faulkner, of Watford, who died on June 13.

INDIAN RAILWAY STAFF CHANGES

Mr. H. H. Yule, Divisional Superintendent, E.I.R., has been permitted to retire from Government service as from July 17.

Mr. E. H. N. Lowther has been appointed to officiate as Divisional Superintendent, E.I.R., as from July 10.

On return from short leave, Mr. A. F. Harvey assumed charge of his duties as Agent, E.B.R., as from July 3. Mr. E. L. Manley, who had been officiating in his place, reverted to his substantive post of Chief Engineer, and Mr. R. W. Taylor, officiating Chief Engineer, reverted to Deputy Chief Engineer, in which grade he is now provisionally permanent.

Mr. Robert F. Smith, Deputy Manager of the Glasgow Corporation Transport Department, has been elected to succeed Mr. James N. Wilson as General Manager of the department on November 13.

Mr. N. B. Reardon, who has been appointed Engineer of Buildings, Canadian Pacific Railway, was associated with construction business and contracting for many years in the United States before entering the service of the C.P.R. as a civil engineer in 1912. From that date he was active in the development and construction of every important C.P.R. building and hotel, of many ticket offices and similar



Mr. H. R. Cripps

Chief Assistant Solicitor, L.N.E.R.,
1923-37

Cripps served throughout the great war, joining the Army in February, 1915, obtaining his commission in 1916, and retiring in 1919 with the rank of Major. He was twice mentioned in despatches, and as a lieutenant was made a Member of the Order of the British Empire (Military Division). He was appointed, at the request of the late Sir Eric Geddes, as Assistant Solicitor under Sir Francis Dunnell, on the formation of the Ministry of Transport in 1919, in which capacity he was closely concerned in the passing of the Railways Act, 1921. In 1923 he was appointed Chief Assistant Solicitor to the London & North Eastern Railway Company, and in that capacity has been concerned with all the principal

special work, and of Canadian Pacific offices in the United States. He became Assistant to the Superintendent of Building Construction in 1914, and in 1917 was appointed Assistant Engineer of Buildings in the Chief Engineer's office, holding that position until his present promotion.

Mr. F. A. Harper, whose appointment as Principal Assistant to the



Elliot] [G. Fry

Mr. F. A. Harper, M.A.

Appointed Principal Assistant to C.M.E. for Electrical Engineering, L.M.S.R.

Chief Mechanical Engineer for Electrical Engineering, L.M.S.R., was recorded in our issue of August 20, had experience with various electrical firms before joining the L.M.S.R. as Assistant (Traction) to the Electrical Engineer in 1934. At Cambridge, Mr. Harper took a first class in the Natural Sciences Tripos and the Mechanical Sciences Tripos, and on going down in 1912 was apprenticed for two years to Mather & Platt Limited, Manchester. From 1915 to 1918 he saw war service with the Royal Air Force, attaining the rank of Captain, and in the latter year joined the Electric Traction Department of the English Electric Co. Ltd. In 1929 Mr. Harper joined the Consulting Engineers' Department of Imperial Chemical Industries Limited, where he remained until joining the L.M.S.R. as previously mentioned. Mr. Harper is an Associate Member of the Institution of Civil Engineers, and of the Institution of Electrical Engineers.

The Southern Railway announces that in future the designations of the Commercial Assistant to the Traffic Manager, and the Deputy Commercial Assistant, will be Commercial Superintendent, and Assistant Commercial Superintendent respectively. The Commercial Superintendent is Mr. W. M. Perts, and the Assistant Commercial Superintendent is Mr. A. E. Hammett.

Mr. A. H. Roberts, Traffic Manager of the Leopoldina Railway, returned to Rio from leave in England on September 4.

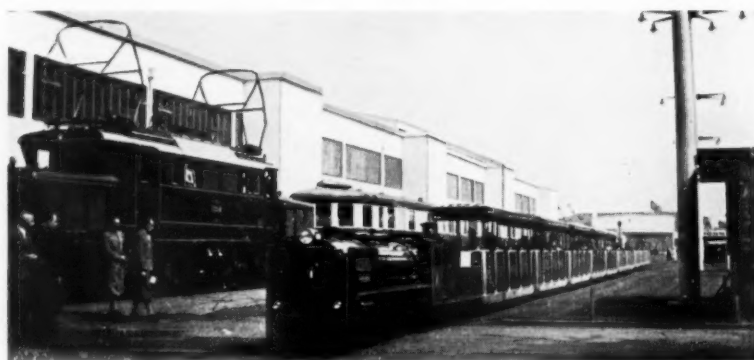
We regret to record the death, on September 7 at the age of 75, of Sir John Lulham Pound, for many years a Director of the London General Omnibus Co. Ltd. Sir John and his family had been connected with the London bus industry from very early years, and his grandfather, Mr. Thomas Lulham, was a Director of the L.G.O.C. from 1860 to 1878 and also Chairman from 1874 to 1878. Mr. Thomas Lulham's daughter married Mr. (afterwards Alderman Sir) John Pound, who was himself a Director of the L.G.O.C. from 1874 to 1908 and Chairman from 1879 to 1908; it was in the latter year that the first great amalgamation of London bus companies took place when the L.G.O.C. absorbed the London Road Car Co. Ltd., and the Vanguard Motorbus Co. Ltd. Sir John then relinquished the chair, but his son, Sir John Lulham Pound, who had been appointed a Director in 1891, continued to occupy a seat on the board until 1912 when control of

the L.G.O.C. was acquired by the Underground Electric Railways Company of London Limited; he was thus a Director throughout the whole period of the changeover from horse to motor traction.

Mr. A. R. Ketterson, who has succeeded Mr. P. B. Motley as Engineer of Bridges, Canadian Pacific Railway, with headquarters at Montreal, received his general and engineering education in Scotland, and, shortly after graduating in civil engineering at Glasgow, joined the service of the C.P.R. in Montreal as inspector on the erection of bridges. Later he became Assistant Engineer in the Chief Engineer's office at Montreal (in the Bridge Department) and served for a few years prior to the great war in the same capacity on western lines at Winnipeg. He served overseas with the Canadian Expeditionary Force, 1916-1919, was twice mentioned in despatches, and awarded the D.S.O. On his return to Canada he re-entered C.P.R. service as Assistant Engineer at Montreal, and in May, 1928, was appointed Assistant Engineer of

Railway Exhibits at Düsseldorf

(See editorial note on page 430)



Above: Lilliput railway train in exhibition grounds, and (below) Reichsbahn exhibits

French National Railways Company

(From our Paris correspondent)

The French Government in a Cabinet meeting on August 31 approved the formation of a National Railways Company, in which all the French systems will be amalgamated. This decision was reached after protracted negotiations between the Government and the companies had resulted in an agreement defining the conditions of the reorganisation. A decree, signed by the President of the Republic, gave the decision force of law and was one of the last acts of the Government under the special powers authorising legislation by decrees until August 31. The new company will take over the working of the railways on January 1, 1938, and in the meantime will proceed to draft preliminary plans for the reorganisation.

Another decree appointed M. Guinand as Chairman of the board of the National Railways Company, and M. Grimpret as Vice-Chairman. The General Manager of the company will be M. Le Besnerais, now General Manager of the Northern Railway Company, and the Assistant General Manager will be M. Surleau, now General Manager of the Alsace-Lorraine Railways (see also page 451 this week). The board of administration will be so formed that the Government will have an absolute majority with 51 per cent. of the capital holdings against the companies' 49 per cent.

The capital of the new company has been fixed at fr. 1,419,412,000 in 2,838,824 shares of fr. 500 each, of which 1,447,800 will be B shares and 1,391,024 A shares. The B shares will be taken by the Government in consideration of its surrender to the National Company of the Ouest-Etat and the Alsace-Lorraine lines, and in recognition of State expenditure made from time to time on all lines, and of advances made by the Treasury to the Common Fund instituted in 1921. The A shares will go to the five existing companies in consideration of their transfer to the National Company of all their assets except their *domaines privés*, in the following proportions: Nord, 279,596; Orleans, 228,406; Est, 250,384; P.L.M., 520,522; Midi, 112,116. These shares will be non-negotiable and will bear no interest until 1955, when these companies will be dissolved, and the shares will be divided among their own shareholders. The five companies will also receive from the National Company annual payments corresponding to statutory interest, guaranteed dividends, and redemption of shares. The year 1955 has been chosen as the average for the respective dates of expiry of the concessions of the five companies. As already mentioned in an editorial note in THE RAILWAY GAZETTE last week, the 12 representatives of the companies on the board of the new National Company are to be replaced after 1955 by six representatives of the shareholders.

The board of the National Company can delegate part of its powers to a managing committee composed, until 1955, of six representatives of the State and five representatives of the companies. After 1955 the managing committee will consist of six representatives of the State and three representatives of shareholders. At the end of the duration of the National Company (in 1982) its whole assets will be handed over to the State without payment.

In a statement issued by M. Queuille, Minister of Public Works, it was explained that the National Railways Company provides for the association of the State and the existing companies in the operation of the railways. The State will have a majority in regard to both capital holdings and management, as the board of administration will comprise a majority of representatives of the general interests of the country. The Minister stated that the reorganisation would permit measures of simplification and economy. An essential feature is the institution of a financial system designed to assure the gradual balancing of receipts and expenditure. In this way the formation

of the National Company is an important contribution to the country's financial recovery.

M. Chautemps, the Premier, commenting on the railway reorganisation, said that the agreement assures a happy conciliation between the authority of the State and the requisite maintenance of the flexible methods of management essential for the success of any great industrial and trade organisation. In a word, added the Premier, we have avoided the double danger of allowing the public interest to be dominated by private interests or of subjecting the railways to a State bureaucratic régime. For the first time also the railway working staff had been given a hand in the management as four employees would be members of the board of administration.

Transport Co-ordination

At the same Cabinet meeting the Government adopted a decree for the co-ordination of transport throughout the country. This measure provides for the co-operation of the departmental councils, the equivalent of county councils in France. For this purpose the decree also creates a *Conseil Supérieur des Transports* (Supreme Board of Transport), which will amalgamate all existing co-ordination organisations.

STAFF AND LABOUR MATTERS

The Trades Union Congress at Norwich

The meeting of the Trades Union Congress at Norwich this week has attracted some attention. The leaders of the railway trade unions are among the delegates attending the congress, the President of which is Mr. Ernest Bevin, General Secretary of the Transport and General Workers' Union. On Monday last, September 6, Mr. Bevin delivered, in characteristic style, his presidential address. On the question of trade union membership he said "in this congress we have represented an organised membership of approximately four millions. In a rough calculation I have made, I estimate that the agreements made by the trade unions, together with the work done by us through trade boards, cover nearly 9,000,000 people."

Mr. Bevin referred to the tendency towards State interference in the regulation of wages and conditions. "We must," he declared, "consider carefully the question as to how far the State should be permitted to interfere in the regulation of wages and conditions." Their movement was a voluntary one and the claim for State regulation must not be carried too far. It might easily lead them on to the slippery slope of the totalitarian state under capitalist control by which their very liberty might be destroyed.

The General Council of the congress

has in the past year extended its associations with the medical, scientific and technical professions; and in this connection Mr. Bevin said, "the nation has awakened to the fact that too great a price can be paid for the mad rush to increase production. Notwithstanding all the money which has been spent to cure known diseases, industry is constantly creating others. Science has made amazing progress, but society has not kept pace with it in making the fundamental readjustments and assimilating the results of research, discovery and invention. There is not only a time lag, but the inertia and rigidity of our social and economic structure to be overcome."

"The General Council believes that men of science can make a great contribution to progress by assisting such a movement as ours with their counsel and knowledge. It has been decided to establish a scientific advisory council, whose purpose will be to enable this congress and its constituent unions to secure help and advice of leading scientists in some systematic and regular way." This did not, of course, mean that they were inviting scientists to frame their policy for them, but the General Council cordially welcomed this opportunity to consult with representative scientists by means of such an advisory council.

Institution of Railway Signal Engineers: Summer Meeting Cruise

On September 4 a party of about 130 members and guests of the institution, with their ladies, under the leadership of the President, Mr. H. M. Proud, Chief Commercial Engineer, Westinghouse Brake and Signal Co. Ltd., left Tilbury on the mv. *Derbyshire* for a week's cruise to Hamburg, Antwerp and Rotterdam. The President was supported by:—

Mr. G. H. Crook, Vice-President; Messrs. C. Carslake, W. Challis, F. Downes, E. F. Fleet, R. S. Griffiths, H. E. Morgan, J. W. Punter, and W. S. Roberts, Past Presidents; Messrs. F. L. Castle, F. J. Dutton, and R. F. Morkill, Members of Council; and Mr. M. G. Tweedie, Honorary Secretary.

The vessel reached Hamburg on Sunday, and on Monday, September 6, where a welcome was extended on behalf of the German State Railway by the Civil Engineer in charge of the Hamburg Division, and a number of other English-speaking engineers; the party proceeded by special train to Berlin. While the ladies made a motor-coach tour of the city, the gentlemen, in two parties, visited an all-electric signalling installation at Berlin-Spandau, a double-wire mechanical one at the Stadium station, and the premises of the Vereinigte Eisenbahn-Signalwerke at the Blockwerk, Siemensstadt, where they were received by Herr Professor Dr. H. F. Arndt, a member of the institution, and other chief officials. Interesting power and automatic signal apparatus, A.T.C. equipment, lock-and-block, and other appliances in general use on the Reichsbahn were seen.

At 1.0 p.m. the whole party assembled at the Ministry of Transport and was entertained to luncheon by the German State Railway. The chair was taken by Dr. Dormmüller, General Manager and Minister of Transport, supported by Herr Stäckel, Chief of the Signal Department; Herr Dr. Leibbrand; and Herr Emmelius. Dr. Dormmüller extended a hearty welcome to the visitors; the Reichsbahn, he said, was happy to return some of the hospitality its officers had often received in England. Signalling was a most important service, and he hoped they had seen something of interest; development in Germany had been on somewhat different lines to that seen in England.

Mr. H. M. Proud, responding, expressed the thanks of the institution for the wonderful hospitality extended to its members and the friendship thereby evinced. Young people were in the party, and he hoped the visit would further promote friendship and peace between their two nations.

In the afternoon, again as guests of the Reichsbahn, the party proceeded in motorcoaches to Potsdam to visit the Palace of Sans Souci and other objects of interest; tea was provided at the historic mill. Leaving Berlin in the evening, the party again embarked

and left next day for Antwerp, where various excursions had been arranged. The party is due to arrive in Liverpool on Sunday, September 12. The

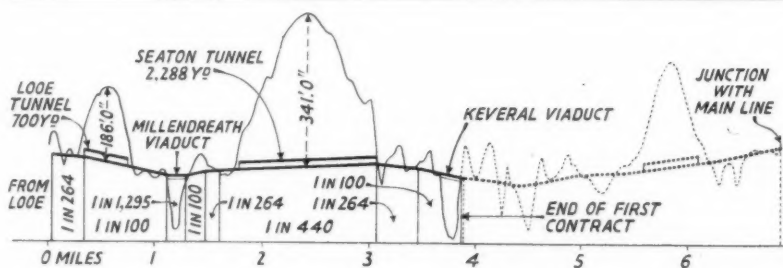
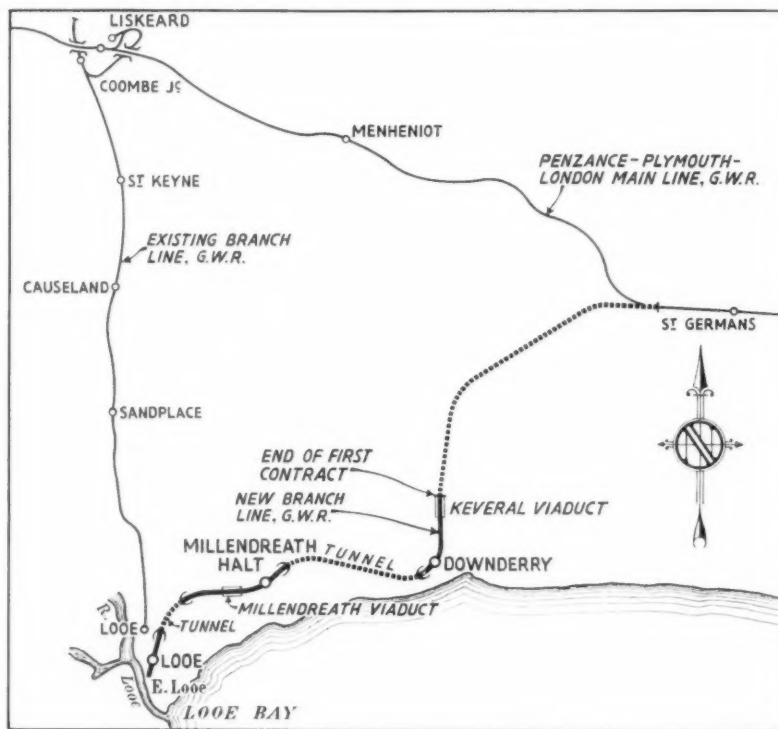
arrangements for the cruise were made by the General Purposes Committee of the institution, consisting of the President, Vice-President, and Honorary Secretary; and Messrs. R. S. Griffiths, F. L. Castle, R. F. Morkill and C. H. Hills. The last named was, however, unable to accompany the party.

The New G.W.R. Branch to Looe

Work in connection with the new branch of the Great Western Railway from St. Germans to Looe has been begun on the first portion of about four miles between Looe and Keveral. There will be three stations on the new line—at Looe, Millendreath, and Downderry—and two viaducts, one at Millendreath of nine 70-ft. spans and three 35-ft. spans, the other at Keveral of eleven 70-ft. spans and two 35-ft. spans. Both viaducts will be of masonry and of imposing design, the former being 123 ft. above river level and the latter 144 ft. Two tunnels

have to be bored, one at Looe, 700 yd. long, the other at Seaton, 2,288 yd. long. For the construction of the latter there will be three shafts to permit of eight faces being worked.

Other works on the line include three accommodation bridges and five culverts, and a total of about 700,000 yd. of excavation in connection with cuttings and tunnels is involved. A new road leading from Polliscourt to the site of the proposed new Great Western Railway hotel is included in the present contract.



Sketch map and profile of the new Looe branch

MINISTRY OF TRANSPORT ACCIDENT REPORT

Near Sandal and Walton, L.M.S.R.: May 30, 1937

About 11.43 a.m. the 9.50 a.m. special excursion, Todmorden to Birmingham, consisting of 10 8-wheeled bogie coaches and drawn by 4-6-0 engine No. 5282, was traversing No. 38 facing points in the up passenger line about $\frac{1}{4}$ -mile north of Sandal and Walton station, when the trailing bogie of the last vehicle became derailed, and then the leading bogie; the coach, dragged along askew, demolished the post of a signal gantry. It remained coupled and the vacuum connection did not part, but impact with the post tore off the trailing bogie and, shortly after, the leading one. The coach was thrown on its side and dragged 250 yd. until the driver, feeling a pluck and looking back, stopped the train. One passenger was killed, and another died in hospital, where 4 were detained; 3 others and the guard suffered minor injuries and shock. Prompt measures were taken to obtain medical assistance. The weather was fine and the rails dry. Col. A. C. Trench conducted the inquiry.

The train was travelling under clear signals at an estimated speed of 30 to 40 m.p.h., and had been notified in the fortnightly notice of May 24. Permanent way renewals were to be undertaken at No. 38 points, and, as explained below, the right-hand switch blade—not required for this train—had been released from all fastenings except one fish-bolt. It lay correctly while the leading portion of the train passed over it, but, being jarred, moved close to the stock rail before the last bogie of all passed; the wheels were trapped between the converging blades and unfortunately rode over the left-hand one and were diverted to the left.

Instructions had been issued for changing certain points and crossings on this day "between trains." A permanent way gang of about 20 men under Ganger Cox, and a signal and telegraph gang of 8 under Signal Lineman Styler, were doing this work. They had already done some work on other points, carrying out all the prescribed regulations, before dealing with No. 38; there was a good deal of conflicting evidence as to times and events after 11.0 a.m. The times quoted below seem the most probable ones. About that hour Cox, seeing this work almost finished, asked Signalman Buxton if he could have the up passenger line; Buxton replied "No," as a special was due at 11.27 a.m. Cox was aware it was running. He went back to his gang and started them on "preparatory" work, which he considered would not interfere with the normal passage of the special. Owing to a speed restriction $\frac{1}{4}$ mile back there was no chance that its speed would be high. The right-hand switch and stock rail of No. 38 points were to be renewed. There was an economical facing-point lock. Switch

blades were connected by 2 plain stretcher bars, 4 ft. and 11 ft. from the toe, in the province of the Permanent Way Department, and 9 in. from the toe by an f.p.l. stretcher, coupled to the point rodding. Each switch blade and the bolt were mechanically detected. The f.p.l. stretcher was bolted to the switch rail and the detector rod was connected by a split cotter; they were in the province of the Signal Department.

As preparatory work, Cox directed his men to secure the left-hand switch with a clip, remove 3 out of the 4 bolts in fishplates at both ends of the right-hand stock rail, and in those of the right-hand switch rail, and release the bolts securing the plain stretchers to the latter. The rail anchor between switch and stock rails was found released after the accident; Cox did not recollect ordering this, but may have done so. He called to Lineman Styler that he wanted him to release the other switch rail connections when they had got the road. Both agreed as to the giving of a message of this nature, but neither was certain of its exact wording, nor was the one man who overheard it.

There was also disagreement as to the time, but Col. Trench concluded it was before 11.20 a.m. Styler, however, incorrectly understood that Cox had already blocked the road and wanted the connections released at once. With a man bending over work and having his back to the speaker, misunderstanding between "when we have" and "as we have" got the road might easily arise. Styler consequently left some work, came to No. 38 points and released the f.p.l. stretcher and detector rod from the right-hand switch. No man recollected seeing him do it, but it was probably before the plain stretchers were released by the permanent way men. Evidence was very conflicting.

About 11.20 a.m. Cox went to sign the signal box register for the down road work as completed. Shortly after he asked Buxton to ascertain where the special was; learning it was 10 min. late he told his men to stand aside until it passed and had some slide chair bolts re-tightened. He estimated the work would take 35 to 40 min., 10 min. of that being saved by the preparatory work. He would have a 50-min. occupation after the special, and was waiting to sign for that when it passed. After the accident the right-hand switch was almost against the stock rail; all stretchers and the detector rod were found uncoupled. Markings confirmed this as the exact cause of the derailment.

Inspecting Officer's Conclusions

Responsibility for the accident must be shared between Cox and Styler. Cox did not suggest that he had taken steps to block the road. Aware of the train's

approach he was only doing preparatory work, such as was usual and safe without requiring any check or speed restriction. His action was not reasonably careful, though his claim that but for the detachment of lock stretcher and detector rod by Styler the accident would not have occurred is probably correct. Styler admitted he ought to have carried out Rule 77 before working on facing points, but thought it would be all right for a few minutes, in view of what he understood to be Cox's verbal assurance that he had blocked the road. It is probably true that but for the detachment of the plain stretchers by the permanent way gang, his own action, probably taken before theirs, would have had no untoward result. No doubt the verbal message was genuinely misunderstood. Cox would not have said he had blocked the road if it was not the case. His statement that he could not obtain full possession until the train had passed is accepted. There was no apparent reason why Styler should leave uncompleted work to go to No. 38 points except on what he understood to be a proper request.

It is expressly to guard against possible misunderstanding that the rules prescribe the elaborate procedure requiring both men in charge to sign the signal box register and obtain the signalman's countersignature, besides other precautionary measures. If compliance had not been postponed by Styler for a few minutes the accident would not have occurred. Both men have considerable service and good records to their credit, and gave evidence frankly and openly.

Remarks

Col. Trench makes no recommendation in this case. It was suggested at the inquest, where he was Assessor to the Coroner, that such a misunderstanding could have been avoided by a representative of the Traffic Department being present to act as co-ordinating authority between the Permanent Way and Signal Departments. There are occasions when this may be justified, and the company is considering the suggestion, but the present regulations cannot be criticised as unsatisfactory, though it may be possible to improve them. Their basic principle is that the man in charge of work affecting the track must himself take all necessary measures for protection. When men of both departments are working, the man in charge of each must take the necessary precautions, precautions not identical in detail for each department, and not necessarily commencing or finishing at the same times.

Present regulations may in some cases involve duplication, which may be extravagant in time and/or labour, but they do prescribe clearly the individual responsibilities of the man in charge of each department, together with written proof thereof, so that compliance with them should avoid any risk of verbal misunderstandings.

NOTES AND NEWS

Northern Counties Committee (L.M.S.R.).—Traffic receipts of the Northern Counties Committee for the first 34 weeks of the current year amount to £270,702, an increase of £2,212.

Continuance of Rail Fare Concessions for Visitors to Germany.—The special concession accorded to visitors to Germany in reduced rail fares will be continued throughout next year. All travellers whose permanent residence is outside Germany are assured of a 60 per cent. reduction in fares over the State Railway system.

Memorial to Mr. J. S. Anderson.—A silver chalice, paten, and alms dish have been presented to the chapel of Westminster Hospital by a few Metropolitan Railway friends in memory of the late Mr. John Sloane Anderson, formerly General Manager of the Metropolitan Railway, and afterwards Secretary, Treasurer, and Solicitor to the London Passenger Transport Board. The chalice is based on one found in York Minster in the grave of Archbishop de Melton, who died about 600 years ago.

Withdrawal of Passenger Train Service on Methven Branch.—The L.M.S.R. has decided to close for passenger traffic as from September 26 the 1½ mile long branch line between Methven Junction on the Perth-Crieff-Balquhider line and Methven (Perthshire). Methven, which is the only station on the branch, will be closed to passengers, but passenger train parcels, miscellaneous, horse, and livestock traffic will continue to be dealt with, conveyance being provided by freight train.

Census of Railway Employees.—The total staff employed by the railway companies of Great Britain and by the London Passenger Transport Board in connection with its railways during the week ended March 13, 1937, was 599,652, according to a return issued by the Ministry of Transport on Wednesday. This compared with 585,611 during the week ended March 7, 1936, an increase of 14,041, or 2.40 per cent. The total amount of salaries and wages paid for the year 1936 was £104,013,000, compared with £101,295,000 in 1935.

Team Valley Trading Estate Railway.—The Team Valley Trading Estate at Gateshead-on-Tyne has begun operation over part of the five-mile length of line in course of construction within the Estate. The building of this line began in May last, and during the intervening four months 21,500 cu. yd. of earth have been excavated, and 48,000 cu. yd. of filling used, most of which have been taken from local pit heaps. Foundations have been laid for the concrete bridge which will carry the railway over Kingsway, the main avenue of the Estate. The railway connects with the L.N.E.R. Over

50 factories are now being built on the Estate.

New Railway Sanctioned in Spain.—The Valencia *Official Gazette* of August 13, contains a Decree definitely approving the three projects for the proposed railway from Torrejon de Ardoz to Tarancon, and authorising the construction. The work will be carried out urgently by administration.

Northampton Polytechnic Evening Courses in Engineering.—The recently issued 1937-8 prospectus of the Northampton Polytechnic, St. John Street, London, E.C.1, advertises that evening classes are provided in all branches of mechanical and structural engineering. The 1937-8 session will begin on Monday, September 20. Copies of the prospectus may be obtained free from the Principal.

Level Crossing Collision near Stoke-on-Trent.—The 8.30 a.m. Euston-Manchester L.M.S.R. express struck a motor lorry laden with heavy stones on an occupation crossing near Barlaston, Stoke-on-Trent, on Wednesday, but no derailment took place. Although the lorry was wrecked, its driver escaped with slight abrasions. According to his own statement, he was reversing over the crossing when the collision occurred.

Yorkshire Transport Society.—A society known as the Yorkshire Transport Society has been formed in Bradford to provide a field for discussion and study among those interested, either in a professional capacity or otherwise, in the history and development of the transport industry. Among the objects of the society is the arranging of visits to places of transport interest, the preparation of a syllabus of monthly lectures during the winter, and the formation of a library and photographic collection for the use of members. Arrangements have been made for the inaugural series of lectures and papers. Particulars of membership may be obtained from the Secretary, 234, Gladstone Street, Bradford Moor, Bradford, Yorks.

Foreign Visitors to Britain in July.—The Travel and Industrial Development Association announces that official figures of foreign visitors to Britain for July, issued by the Home Office, continue to show an increase over last year, which was itself a record year. Excluding the numerous visitors from the Dominions (whose arrivals are not recorded at the ports), and week-end and day excursionists from France and Belgium, there were 68,769 holiday visitors to Britain in July and 8,580 visitors on business, a total of 77,349 and a total increase of 3,089 over July last year. The principal increase was in holiday visitors from the U.S.A., who numbered 25,362 as against 22,524 in July last, an increase of 2,838. In spite of the adverse exchange, the number of French visitors

(14,671) was at approximately the same level as last year when the exchange was more favourable. The figures for some of the other countries which show an increase were: Belgium, 2,403; Germany, 6,788; Holland, 5,382; Scandinavian countries including Denmark, 4,051; and Switzerland, 2,171.

German Railway Accident.—On September 5, a special train of 17 wooden-bodied coaches carrying pilgrims from Rommerskirchen to Kevalaer was derailed near the station of Holzheim, about 10 miles from Düsseldorf. The first four coaches were overturned and badly smashed, and altogether, according to latest reports, 19 persons lost their lives.

Withdrawal of Passenger Service on Rosebush Branch, G.W.R.—The Great Western Railway announces that owing to the heavy decline in local traffic, the passenger train service between Clynderwen and Fishguard via the Rosebush and Letterston line will be withdrawn on the introduction of the winter timetable on September 27. The stations at Llanycefn, Maenclochog, Rosebush, Letterston, and Puncheston, will be closed to passengers but facilities will continue to be afforded for parcels, mineral, livestock, and other descriptions of merchandise business. The halts at New Inn Bridge, Castlebythe, Martell Bridge, and Beulah will be entirely closed.

Inspection of Head, Wrightson Teesdale Iron Works.—On September 17, the last day of the autumn meeting at Middlesbrough of the Iron and Steel Institute the President and members of the institute and representatives of the press have been invited to visit the Teesdale Iron Works, Thornaby-on-Tees, of Head, Wrightson & Co. Ltd. In the iron foundries here, there will be an opportunity of seeing railway chairs in course of construction, and a variety of high-class steel castings and heat-resisting steels will be seen in the electric steel foundry. After inspection of the heavy machine shops and the drop forgings and stamping department, the party will watch the work in progress on the production of 20-ton hopper wagons for the L.N.E.R., part of an order for 900. A luncheon will be held after the inspection of the works.

Chinese Railways and the War.—Messages from China indicate that in the north the Japanese armies have forced the Nankow pass, and captured the portion of the Peiping-Suiyuan Railway from Peiping to Kalgan. They are at present engaged in clearing the long tunnel at the top of the Nankow pass of eight wrecked locomotives which the retreating forces blew up to hinder pursuit. From Kalgan westwards the line appears still to be in Chinese possession. On the Peiping-Hankow line irregular fighting is proceeding about 30 to 40 miles south of Peiping. On the Tientsin-Pukow line, fighting is proceeding about 30 miles south of Tientsin and the railway junctions at Tsinal and Hsuechowfu have been

bombed. Shanghai North, which is the principal station and houses the offices of the Nanking Shanghai Railway, is being fiercely attacked, but is still held by Chinese forces. The lines approaching Shanghai have been bombed in an attempt to interrupt traffic and prevent reinforcements being brought up. The North station was destroyed in 1932, and it is feared it may be destroyed again. At Tientsin it is reported that an important part of the Peiping Liaoning Railway head office was destroyed in the bombardment at the end of July.

Lubrication of the Silver Jubilee.—The Silver Jubilee train of the London & North Eastern Railway has now been running for nearly two years, during which period it has covered over 260,000 miles. This express runs 2,680 miles a week at an average speed between King's Cross and Darlington of 70.4 m.p.h., and between King's Cross and Newcastle of 67.1 m.p.h., within a maximum speed limit of 90 m.p.h. During the whole period there have been only two cases of hot axleboxes

on the engines working the train. We are informed that the axleboxes of the engines concerned are lubricated exclusively by Wakefield Silver Jubilee engine oil, and Wakefield patent mechanical lubricators supply the oil to the axleboxes, valves, and cylinders.

Northern Ireland Road Transport.—The report of the Transport Investigation Committee appointed by the Government of Northern Ireland recommends that a further period of four months should elapse to enable the Road Transport Board to concentrate on the organisation of administration and services, and that during this period the board should sympathetically consider any representations of inefficient service or excessive charges, and remedy them if satisfied that the complaints of the petitioners are well founded. The decision of the Ministry of Home Affairs is to be final in any dispute between petitioners and the board. The Ministry has requested the Investigation Committee to act in an advisory capacity during the four months' period and to make recommendations.

British and Irish Railway Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices	
			Sept. 8, 1937	Rise/ Fall
G.W.R.				
Cons. Ord.	64½	45½	61½	—2
5% Con. Prefce.	126½	116½	116½	—
5% Red. Pref.(1950) ...	113	108½	109½	—
4% Deb.	119½	110½	105½	—
4½% Deb.	121	114	111	—
4½% Deb.	129	121	117½	—
5% Deb.	141	124	128½	—
2½% Deb.	79½	74	69½	—
5% Rt. Charge	136½	130	127½	—
5% Cons. Guar.	135½	127½	124	—
L.M.S.R.				
Ord.	35½	17	30	—2
4% Prefce. (1923)	83	52½	75½	—½
4% Prefce.	92½	81	82	—
5% Red. Pref.(1955) ...	109½	103½	106	—
4% Deb.	111½	105½	101	—½
5% Red. Deb.(1952) ...	119½	115½	112½	—
4% Guar.	106½	101½	99½	—
L.N.E.R.				
5% Pref. Ord.	14	9	9½	—½
Def. Ord.	7½	4½	4½	—½
4% First Prefce.	79½	55½	71½	—½
4% Second Prefce.	31½	18½	28½	—½
5% Red. Pref.(1955) ...	100½	77½	98	—
4% First Guar.	104½	98½	96	—½
4% Second Guar.	99	90	89½	—½
3% Deb.	85½	79	76	—
4% Deb.	109½	104½	100½	—½
5% Red. Deb.(1947) ...	116½	110½	110½	—
4½% Sinking Fund Red. Deb.	111½	107½	108	—
SOUTHERN				
Pref. Ord.	98½	82½	90	—½
Def. Ord.	27½	20½	21½	—½
5% Pref.	120½	118½	113½	—
5% Red. Pref.(1964) ...	119½	115½	113½	—
5% Guar. Prefce.	136	129½	125	—
5% Red. Guar. Pref. (1957) ...	120	115½	114	—
4% Deb.	117½	109½	104	—
5% Deb.	140	134	126½	—
4% Red. Deb.	116½	110	106½	—
1962-67				
BELFAST & C.D.				
Ord.	9	4½	4	—
FORTH BRIDGE				
4% Deb.	107	105	101½	—
4% Guar.	107½	104	100½	—
G. NORTHERN (IRELAND)				
Ord.	19½	9½	7½	+½
G. SOUTHERN (IRELAND)				
Ord.	63	41	30	—
Prefce.	65	46	42	—
Guar.	97½	81	71½	—
Deb.	99½	83½	86½	—
L.P.T.B.				
4½% "A"	127½	121	113½	—
5% "A"	138½	133½	125½	—
4½% "T.F.A."	111½	108½	105	—
5% "B"	131½	123½	117½	—
"C"	112½	93	81	—1
MERSEY				
Ord.	40½	23	29½	—1
4% Perp. Deb.	103	98	97	—
3% Perp. Deb.	78	74½	74½	—
3% Perp. Prefce.	68½	63½	66½	—

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 35th Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,870½ mls.)						
Passenger-train traffic...	631,000	585,000	+ 36,000	18,707,000	17,960,000	+ 747,000
Merchandise, &c. ...	497,000	491,000	+ 6,000	16,975,000	16,487,000	+ 488,000
Coal and coke ...	241,000	229,000	+ 12,000	8,833,000	8,345,000	+ 488,000
Goods-train traffic ...	738,000	720,000	+ 18,000	25,808,000	24,832,000	+ 976,000
Total receipts ...	1,369,000	1,315,000	+ 54,000	44,515,000	42,792,000	+ 1,723,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	410,000	402,000	+ 8,000	12,246,000	11,671,000	+ 575,000
Merchandise, &c. ...	344,000	325,000	+ 19,000	11,684,000	11,261,000	+ 423,000
Coal and coke ...	236,000	223,000	+ 13,000	8,553,000	8,053,000	+ 500,000
Goods-train traffic ...	580,000	548,000	+ 32,000	20,237,000	19,314,000	+ 923,000
Total receipts ...	990,000	950,000	+ 40,000	32,483,000	30,985,000	+ 1,498,000
G.W.R. (3,738½ mls.)						
Passenger-train traffic...	270,000	263,000	+ 7,000	7,908,000	7,670,000	+ 238,000
Merchandise, &c. ...	215,000	199,000	+ 16,000	6,903,000	6,626,000	+ 277,000
Coal and coke ...	117,000	98,000	+ 19,000	3,875,000	3,472,000	+ 403,000
Goods-train traffic ...	332,000	297,000	+ 35,000	10,778,000	10,098,000	+ 680,000
Total receipts ...	602,000	560,000	+ 42,000	18,686,000	17,768,000	+ 918,000
S.R. (2,157 mls.)						
Passenger-train traffic...	409,000	382,000	+ 27,000	11,780,000	11,170,000	+ 610,000
Merchandise, &c. ...	68,500	68,500	—	2,134,000	2,193,500	— 59,500
Coal and coke ...	29,500	30,500	— 1,000	1,036,000	1,067,500	— 31,500
Goods-train traffic ...	98,000	99,000	— 1,000	3,170,000	3,261,000	— 91,000
Total receipts ...	507,000	481,000	+ 26,000	14,950,000	14,431,000	+ 519,000
Liverpool Overhead (6½ mls.)						
Mersey (4½ mls.) ...	4,279	4,260	+ 19	145,851	140,814	+ 5,037
*London Passenger Transport Board ...	557,400	557,300	+ 100	5,551,300	5,533,400	+ 17,900
IRELAND						
*Belfast & C.D. pass. (80 mls.) ...	3,671	4,162	— 491	96,949	97,526	— 577
" " goods ...	487	522	— 35	16,878	19,404	— 2,526
" " total ...	4,158	4,684	— 526	113,827	116,930	— 3,103
Great Northern (54½ mls.) pass. ...	16,200	17,100	— 900	398,300	388,600	+ 9,700
" " goods ...	9,450	9,400	+ 50	327,400	341,150	— 13,750
" " total ...	25,650	26,500	— 850	725,700	729,750	— 4,050
Great Southern (2,076 mls.) pass. ...	55,052	54,098	+ 954	1,307,589	1,296,457	+ 11,132
" " goods ...	42,044	43,806	— 1,762	1,421,585	1,449,257	— 27,672
" " total ...	97,096	97,904	— 808	2,729,174	2,745,714	— 16,540

* 10th week (before pooling)

† 36th week

CONTRACTS AND TENDERS

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received an order from the Buenos Ayres Pacific Railway for 75 underframes and bogies, complete with wheels and axles, for 30-ton fruit wagons to be assembled in South America.

Wota (India) Limited has received orders from the Indian Stores Department for 275 sets of piston valve caps.

Vickers (India) Limited has received orders from the Indian Stores Department for 200 I.R.S. metre-gauge covered four-wheeled wagons (Jute) type MCJ.

The Bombay, Baroda & Central India Railway Administration has recently placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

Rivet, Bolt and Nut Co. Ltd., Rivets, bolts and nuts.

David Mosley & Sons Ltd., Indiarubber hose, Linley & Co., Wood screws.

The Bengal-Nagpur Railway Administration has recently placed the following orders :—

Mannesmann Trading Company, 600 carriage and wagon tyres.

Blaenavon Steel Co. Ltd., quantity of steel engine and tender tyres.

J. McIlwraith & Co. Ltd., 13,000 yd. of canvas cloth for tarpaulins.

The Exors. of James Mills Limited have received orders from the Indian Stores Department for a total of 75,000 m.s. Macbeth rail keys.

Stahlunion Export has received an order from the Bikaner State Railway Administration for fishbolts to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The Egyptian State Railways Administration has recently placed the following orders :—

Usines Emile Henricot : Manganese diamond crossings (Ref. No. E.S.R. 2.97, total cost £600; delivered f.o.b. Antwerp).

Henschel & Sohn : Cylinders (Ref. No. E.S.R. 21.652, total cost £228, delivered f.o.b. German or Dutch port).

Vereinigte Deutsche Metallwerke, through F. Suren : Telephone materials (Ref. No. E.S.R. 34.804, items 1 and 2, total cost £1,680; delivered f.o.b. Antwerp or Rotterdam).

Thomas Bolton & Sons : Telephone materials (Ref. No. E.S.R. 34.804, items 3 to 6, total cost £112 8s.; delivered f.o.b. Liverpool).

Standard Telephone & Cable Co. Ltd.: Automatic exchange (Ref. No. E.S.R. 34.788, total cost £1,222; delivered f.o.b. London).

W. F. Dennis & Company : Insulators (Ref. No. E.S.R. 34.793, total cost £1,790, Hamburg).

British Insulated Cables Limited : Cable (Ref. No. E.S.R. 30.345, item Nos. 1, 2, 3 and 4, total cost £2,158; delivered f.o.b. Liverpool).

Felten & Guillaume, through W. F. Dennis & Co. : Cable (Ref. No. E.S.R. 30.345, item No. 5, total cost £186, delivered f.o.b. Antwerp).

The Rivet Bolt & Nut Company : Bolts, nuts and washers (Ref. No. E.S.R. 303.G.3/16, total cost approximately £4,114; delivered f.o.b. Glasgow).

Howell & Co. Ltd. has received an order for 3,500 solid-drawn black steel boiler tubes and 400 solid-drawn black steel superheater smoke tubes, from the Buenos Ayres Western Railway.

The Chinese Government Purchasing Commission, on behalf of the Ministry of Railways, China, has placed the following orders :—

For the Canton-Hankow Railway :—

Hayward-Tyler & Co. Ltd. Two sets of vertical boilers and two sets of duplex water pumps.

Staveley Coal & Iron Co. Ltd. Cast iron flanged pipes and fittings.

For the Chuchow Repair Shop :—

Alfred Herbert Limited. Four electrically-driven drilling machines.

Ormerod Shapers Limited. One shaping and one slotting machine.

D. Wickham & Co. Ltd. has received an order from the Peruvian Corporation for two steel-framed trolleys for carrying sleepers.

D. Wickham & Co. Ltd. has also received an order from the Gwalior State Railway Administration for one Wickham-Minor 7-h.p. railcar.

The A.B.C. Coupler & Engineering Co. (India) Ltd. has received orders from the Indian Stores Department for 200 vehicle sets of MCA-PH type centre buffer couplers with hook slippers suitable for I.R.S. type MCJ four-wheeled covered wagons.

Tubes Limited has received an order for 1,500 solid-drawn black steel boiler tubes from the Buenos Ayres Great Southern Railway.

Reichwald (London) Limited has received orders from the South Indian Railway Administration, to the inspection of Messrs. Robert White & Partners, for 33 copper tube plates.

Beruck & Comens (Engineers) Limited has received orders from the Indian Stores Department for 17 sets of 1 in 8½ diamond crossings.

Cowans, Sheldon & Co. Ltd. has received an order from the Peruvian Corporation for one 60-ft. articulated locomotive turntable.

Guest, Keen, Williams Limited has received an order from the Bengal-Nagpur Railway for a total of 650 cwt. of mild steel hexagon forged black bolts and 900 cwt. of nuts.

Heatley & Gresham Limited has received orders from the East Indian Railway for a quantity of steel steam pipes.

Vickers (India) Limited has received orders from the East Indian Railway for 35 cwt. of nickel chrome steel round.

The Associated Equipment Co. Ltd. has received an order from the Northern Ireland Road Transport Board for 12 petrol-driven Regent passenger vehicles.

Whitelegg & Rogers Limited has received orders for 168 Ajax axlebox grease lubricators required for the coupled wheels of 21 Class 15F 4-8-2 type locomotives, under construction by Henschel & Sohn, for the South African Railways and Harbours Ad-

ministration; and for 120 Ajax axlebox grease lubricators required for 20 2-6-0 type locomotives, under construction by the North British Locomotive Co. Ltd. for the Egyptian State Railways Administration.

Shipments of American railway locomotives, reported by the principal manufacturing plants, totalled 39 in July, compared with 13 in the same month last year, according to Department of Commerce statistics, says Reuters Trade Service from Washington. In June this year shipments totalled 38. For the first seven months this year they aggregated 224, compared with only 40 for the same period last year.

Railway Rolling Stock for Turkey

The Turkish State Railways & Ports Administration is calling for tenders, to be presented in Ankara by October 6, for the supply of rolling stock, including coal trucks, refrigerator vans, goods vans, and trailers for railcars. Firms desirous of offering rolling stock of United Kingdom manufacture can obtain further details of this call for tenders upon application to the Department of Overseas Trade, London, S.W.1. Reference number T.Y. 19181/37 should be quoted.

Tenders are invited by the Madras & Southern Mahratta Railway Administration, receivable by September 21 at 25, Buckingham Palace Road, Westminster, S.W.1, for the supply of 120 broad-gauge and 656 metre-gauge steel locomotive carriage and wagon tyres; 2,552 helical and 1,050 volute springs; and bolts, nuts and rivets.

Tenders are invited by the Egyptian State Railways Administration, receivable at the General Management, Cairo station, by October 5, for the supply and erection of a new swing bridge over Giza canal at Ayyat, and mechanism for Abu-Radi bridge. This work will involve the supply and erection of a double track swing span for El-Ayyat bridge; the supply and erection of mechanism for rotation and wedging for that bridge; and the supply and erection of similar mechanism for rotation and wedging for Abu-Radi bridge. The materials required include about 74 tons of SsA44 rolled steel and about 60 tons of cast steel.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), Simla, invites tenders, receivable by October 6, for the following machine tools and equipment :—

One 16 ft.-20 ft. bed gap bed lathe.

One 8 ft. gap bed (preferably V bed) lathe.

One 4 ft. radius radial drilling, boring and tapping machine.

One 18 in.-22 in. high-speed automatic feed shaping machine.

One bolt and pipe screwing machine, size ½ in.-2 in. bolts and up to 4 in. pipe.

One hand punching, shearing and cropping machine, capacity up to 1½ in. by ½ in. iron.

One band saw with capacity to take 18 in. by 18 in. logs.

One saw sharpening machine to sharpen circular saws up to 42 in. dia.

One smithy blower electrically driven to serve six hearths.

One positive type Rootes pattern blower for cupola—1-ton capacity.

OFFICIAL NOTICES

London and North Eastern Railway

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the warrants for interest payable on the 15th October, 1937, on the Company's 5 per cent. Redeemable Debenture Stock, the balance will be struck as at the close of business on 28th September, and such interest will be payable only to those stockholders whose names are registered on that date.

Transfers of the 5 per cent. Redeemable Debenture Stock should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5 p.m. on 28th September.

By Order,

JAMES McLAREN,
Secretary.

Marylebone Station,
London, N.W.1.
16th September, 1937.

The Institute of Transport Examinations, 1938

NOTICE IS HEREBY GIVEN that the Graduateship and Associate Membership Examinations will be held in London and at other centres on Thursday, Friday and Saturday, April 28th, 29th and 30th, 1938.

The latest date for the deposit of forms of entry is March 1st, 1938 (January 1st if any exemptions are claimed). Full particulars, previous question papers (price 1s. per set, post free), and copies of a revised and enlarged edition of the booklet "The Institute of Transport Examinations: Notes for the guidance of candidates unable to attend preparatory courses" (price 2s. 6d. post free), may be obtained from the undersigned.

By Order of the Council,
A. WINTER GRAY,
Secretary.

15, Savoy Street,
London, W.C.2.
August 17th, 1937.

Nos. 416,471 and 416,907 "Improvements in means for transporting railway vehicles by road"

THE owners of the above patents are desirous of arranging by licence or otherwise on reasonable terms for the manufacture and commercial development of the inventions. For particulars address in the first instance to HERBERT HADDAY & Co., 31 and 32, Bedford Street, Strand, London, W.C.2.

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to:—The Railway Gazette, 33, Tothill Street, Westminster, London, S.W.1.

Railway and Other Reports

Barsi Light Railway.—The directors have decided to recommend at the forthcoming general meeting the payment of a dividend on the ordinary stock of 2½ per cent. for the year to March 31, 1937.

Samana & Santiago Railway.—Revenue receipts for the year 1936 amounted to £17,944, a decrease of £11,263, or 39 per cent., in comparison with 1935, and expenditure was reduced from £25,274 to £22,359, leaving a debit balance of £4,415, compared with a credit balance of £3,933 in the previous year. Goods tonnage was 16,970, against 25,938, and the operating ratio

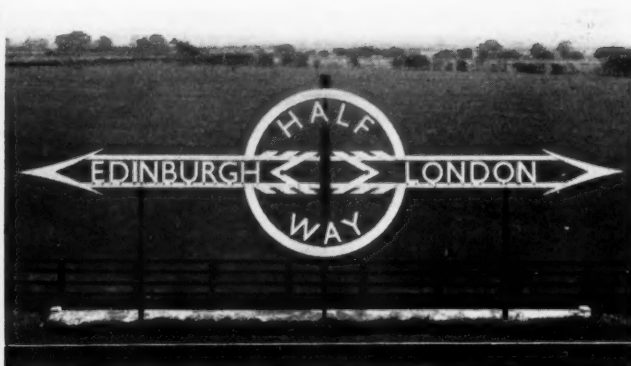
rose from 86.53 per cent. to 124.6 per cent. The drought in the early months of the year did considerable damage to the crops in the company's area. Only about one-half the usual quantity of cocoa was produced, there was little tobacco, less coffee, and at least two plantings of rice were lost. These conditions slowed the flow of the already reduced amount of money in circulation.

Stothert & Pitt Limited.—The directors propose to pay a dividend of 10 per cent. and a cash bonus of 2½ per cent. on the ordinary shares for the year ended June 30 (against a dividend of 7½ per cent. and no bonus for 1935-36). The profit for the year amounted to £65,218 (against £34,726).

Forthcoming Events

- Sept. 11 (*Sat.*).—Stephenson Locomotive Society (London). Visit to Old Oak Common Running Sheds, G.W.R.
 Sept. 14 (*Tues.*).—Permanent Way Institution (Guildford), at Orphanage Hall, Guildford Park Road, 6.45 p.m. "A Realistic View of the Railway Future," by Mr. W. A. Willox.
 Sept. 16-25.—The Model Engineer Exhibition, at Royal Horticultural Hall, Vincent Square, London, S.W.1.
 Sept. 25 (*Sat.*).—Permanent Way Institution (Manchester-Liverpool), at Blackpool, 3 p.m. "Railway Drainage," by Mr. F. McCandlish.
 Sept. 30 (*Thurs.*).—Permanent Way Institution (Brighton), at Welfare Room, Eastbourne, 7 p.m. "Leads of Crossings on Basis of Unit Angles," by Mr. R. Gurd.
 Oct. 4 (*Mon.*).—Yorkshire Transport Society, at County Restaurant, Bridge Street, Bradford, 7.30 p.m. "The Story of the London Bus."

L.N.E.R. lineside signs to indicate to travellers the position of points of interest and the approach to principal stations. (See editorial note on page 429)



Railway Share Market

Junior stocks of the Home railways moved to lower levels this week, but this is a reflection of the general movement to lower prices in evidence in the stock and share markets. Market sentiment has been almost entirely under the influence of the complicated international political outlook. Current prices of railway stocks have to be read in relation to this and not as an indication of any less hopeful views of the traffic outlook. The past week's receipts, in fact, created a good impression. The increased transport charges come into force next month, and subsequent traffics will naturally be studied in the market with a great deal of interest.

Great Western reacted sharply, despite the good traffic return. There is still much divergence of opinion as to whether a larger dividend than 3 per cent. is

likely, although it is generally agreed that to-date the railway is earning fully 4 per cent. on the ordinary stock. L.M.S.R. ordinary was also lower on balance, but had a steadier appearance than most other junior stocks, partly because of the favourable traffic figures. L.N.E.R. second preference was also fairly steady on satisfaction with the traffics and on market estimates that fully 1 per cent. is now being earned on this stock. On the other hand, Southern deferred, market views in connection with which have been mentioned before, was weak, as was the preferred, which has now declined to a level at which a very attractive yield is offered. Most debentures and guaranteed stocks were fairly steady, it being realised that, in comparison with other high grade investments of an equal status, the yields offered are very satisfactory. London

Transport "C" failed to attract much attention, the disposition being to await the impending dividend decision. Argentine railway stocks were again dull and moved to lower prices, although B.A. Gt. Southern 6 per cent. preference was inclined to show a better tendency than of late. Central Argentine issues were out of favour, but the 6 per cent. preference made partial recovery from an earlier reaction. B.A. Western was lower, in common with most ordinary stocks, but this was attributed to general market conditions.

Sentiment is, however, false, affected by doubts whether the claim of the Argentine railways to higher rail charges will be granted in the more immediate future. Canadian Pacific and American railway stocks reflected the sharp reaction of Wall Street markets.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1936-37	Week Ending	Traffics for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices				
				Total this year	Inc. or Dec. compared with 1936		Totals		Increase or Decrease		Highest 1936	Lowest 1936	Sept. 26, 1937	Yield % (See Note)	
							This Year	Last Year							
South & Central America	Antofagasta (Chili) & Bolivia	834	5.9.37	19,360	+ 2,800	36	587,210	485,640	+ 101,570	Ord. Stk.	25	151½	191½	Nil	
	Argentine North Eastern	753	4.9.37	11,086	+ 445	10	100,690	90,068	+ 10,622	"	12	2	101½	Nil	
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	54	45	85	41½	
	Bolivar	174	Aug., 1937	4,800	— 100	35	45,600	52,500	— 6,900	6 p.c. Deb.	9	5	81½	Nil	
	Brazil	—	—	—	—	—	—	—	—	Bonds	16	11½	15½	3¼	
	Buenos Ayres & Pacific	2,806	4.9.37	78,846	+ 4,537	10	766,191	714,163	+ 52,028	Ord. Stk.	171½	6	10	Nil	
	Buenos Ayres Central	190	21.8.37	8150,100	+ 821,500	8	81,160,700	8925,000	+ 8235,700	Mt. Deb.	311½	11	31	Nil	
	Buenos Ayres Gt. Southern	5,084	4.9.37	109,491	— 3,325	10	1,133,871	1,059,726	+ 74,145	Ord. Stk.	313½	13½	22½	Nil	
	Buenos Ayres Western	1,930	4.9.37	42,308	+ 2,919	10	439,021	383,290	+ 55,731	"	295½	11	191½	Nil	
	Central Argentine	3,700	4.9.37	119,330	— 26,067	10	1,314,759	1,286,074	+ 28,685	"	329½	85½	201½	Nil	
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	41½	11½	Nil	
	Cent. Uruguay of M. Video	980	28.8.37	14,828	— 711	9	1,131,474	1,236,447	— 104,973	Ord. Stk.	75½	3	5	Nil	
	Cordoba Central	1,218	4.9.37	32,010	— 5,320	10	375,200	363,850	+ 11,350	Ord. Inc.	5	1	4	Nil	
	Costa Rica	188	June, 1937	31,051	+ 4,093	52	249,333	186,880	+ 62,453	Stk.	361½	32	34	57½	
	Dorada	70	Aug., 1937	16,900	—	35	122,400	112,200	+ 10,200	1 Mt. Db.	107	101½	104½	54½	
	Entre Rios	810	4.9.37	14,565	+ 491	10	137,343	118,656	+ 18,687	Ord. Stk.	17	6	10½	Nil	
	Great Western of Brazil	1,092	4.9.37	6,800	— 200	36	255,500	265,800	— 10,300	Ord. Sh.	12	14½	12	Nil	
	International of Cl. Amer.	794	July, 1937	8420,213	+ 8109,517	31	83,625,846	83,307,205	+ 8,318,641	"	—	—	—	—	
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	—	1st Pref.	12	—	—	Nil
	La Guaira & Caracas	221	Aug., 1937	5,080	+ 135	35	43,000	37,195	+ 6,005	"	9	3	—	—	
Leopoldina	1,918	4.9.37	27,527	+ 2,870	36	822,330	660,235	+ 162,095	Ord. Stk.	101½	31½	5	7½		
Mexican	483	31.8.37	8483,600	+ 891,900	9	82,605,400	82,225,300	+ 8380,100	"	114	14	12	Nil		
Midland of Uruguay	319	July, 1937	7,516	— 237	4	7,516	7,783	— 237	"	112	14	12	Nil		
Nitrate	384	31.8.37	4,993	+ 2,085	35	105,981	87,021	+ 18,960	Ord. Sh.	63½	41½	25½	Nil		
Paraguay Central	274	28.8.37	83,155,000	+ 8314,000	9	830,047,000	822,588,000	+ 87,459,000	Pr. Li. Stk.	85	71	811½	73½		
Peruvian Corporation	1,059	Aug., 1937	92,587	+ 5,347	9	173,721	171,561	— 2,160	Pref.	15	9	10	Nil		
Salvador	100	28.8.37	11,420	+ 255	9	105,049	99,174	+ 5,875	Pr. Li. Dbl.	18	16	22½	Nil		
San Paulo	159	29.8.37	35,775	+ 3,683	35	1,150,108	1,036,055	+ 114,053	Ord. Stk.	86	46½	84½	51½		
Taitai	160	July, 1937	2,940	+ 415	4	2,940	2,525	+ 415	Ord. Sh.	115½	14½	14½	87½		
United of Havana	1,353	4.9.37	18,589	+ 221	10	179,345	157,459	+ 21,886	Ord. Stk.	31½	1	3	Nil		
Uruguay Northern	73	July, 1937	766	— 139	4	766	905	— 139	Deb. Stk.	5	3	8	Nil		
Canada	Canadian National	23,766	31.8.37	1,144,878	+ 13,806	35	25,628,972	23,298,270	+ 2,330,702	—	—	—	—	—	
	Canadian Northern	—	—	—	—	—	—	—	—	4 p.c.	—	—	—	—	
	Grand Trunk	17,228	31.8.37	838,400	— 83,800	35	18,149,400	17,126,200	+ 1,023,200	Perp. Dbs.	76	51	67½	519½	
India	Assam Bengal	1,329	10.8.37	33,660	+ 4,739	19	471,822	437,535	+ 34,287	4 p.c. Gar.	104½	995½	1011½	319½	
	Barsi Light	202	10.8.37	2,257	— 503	19	52,155	47,610	+ 4,545	Ord. Stk.	163½	1015½	101½	Nil	
	Bengal & North Western	2,111	20.8.37	60,198	— 2,953	20	1,186,937	1,077,203	+ 109,734	Ord. Sh.	77½	65½	48	107½	
	Bengal Dooars & Extension	161	20.8.37	3,977	+ 136	20	50,938	48,200	+ 2,738	"	127½	118	30½	57½	
	Bengal-Nagpur	3,268	20.8.37	159,075	+ 14,327	20	2,709,659	2,399,788	+ 309,871	"	104	100½	90½	47½	
	Bombay, Baroda & Cl. India	3,072	31.8.37	219,825	+ 29,700	22	3,727,350	3,445,275	+ 282,075	"	114	110½	111½	54½	
	Madras & Southern Mahratta	3,229	20.8.37	130,500	+ 3,947	20	2,225,458	2,210,220	+ 15,238	"	116½	108½	108½	75½	
	Rohilkund & Kumaon	546	20.8.37	11,104	+ 219	20	223,621	216,971	+ 6,650	"	311	286	310	519½	
	South Indian	2,531	20.8.37	115,009	+ 14,565	20	1,627,983	1,569,532	+ 58,451	"	107½	1025½	101½	57½	
	Various	—	—	—	—	—	—	—	—	—	—	—	—	—	
Various	Beira-Umtali	204	June, 1937	91,505	+ 27,313	40	676,896	577,342	+ 99,554	—	—	—	—	—	
	Egyptian Delta	620	20.8.37	6,534	+ 667	20	89,809	82,106	+ 7,703	Prf. Sh.	214	19½	19½	Nil	
	Great Southern of Spain	—	—	—	—	—	—	—	—	Inc. Deb.	112	19	31½	Nil	
	Kenya & Uganda	1,625	May, 1937	216,935	— 20,539	22	1,334,126	1,229,899	+ 104,227	"	—	—	—	—	
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50½	37	46	75½	
	Midland of W. Australia	277	July, 1937	10,245	+ 31	4	10,245	10,214	+ 31	Inc. Deb.	97	93½	95	45½	
	Nigerian	1,900	17.7.37	26,525	— 1,842	16	817,123	458,496	+ 358,629	"	—	—	—	—	
	Rhodesia	2,451	June, 1937	419,881	+ 130,017	40	3,352,058	2,584,870	+ 767,188	"	—	—	—	—	
	South Africa	13,263	14.8.37	664,577	+ 53,114	20	12,267,269	11,476,617	+ 790,652	"	—	—	—	—	
	Victoria	4,774	May, 1937	822,932	+ 43,220	48	9,312,068	8,986,232	+ 355,836	"	—	—	—	—	
Zafra & Huelva	112	June, 1937	10,643	+ 1,375	26	80,860	57,843	+ 23,017	"	—	—	—	—		

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1%.

† Receipts are calculated @ 1s. 6d. to the rupee. ‡ £ x dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.